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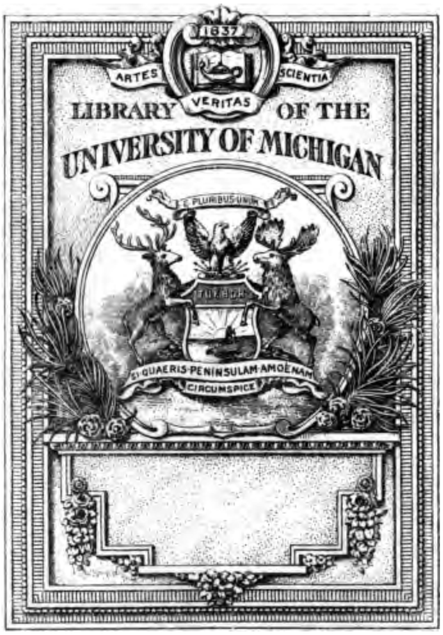

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GEOLOGICAL SURVEY OF PENNSYLVANIA, REPORT P 4, 1889.

A DICTIONARY

OF THE

FOSSILS OF PENNSYLVANIA

AND NEIGHBORING STATES

NAMED IN THE

REPORTS AND CATALOGUES OF THE SURVEY.

Compiled for the convenience of the citizens of the State
BY J. P. LESLEY, STATE GEOLOGIST.

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VOL. 3.

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1890.

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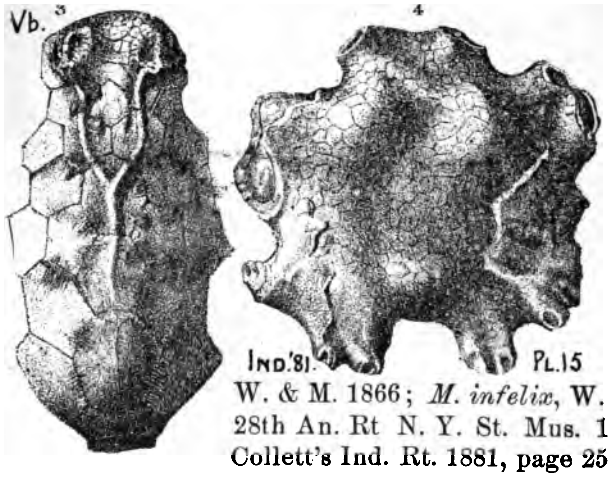
OF

FOSSILS FOUND IN PENNSYLVANIA

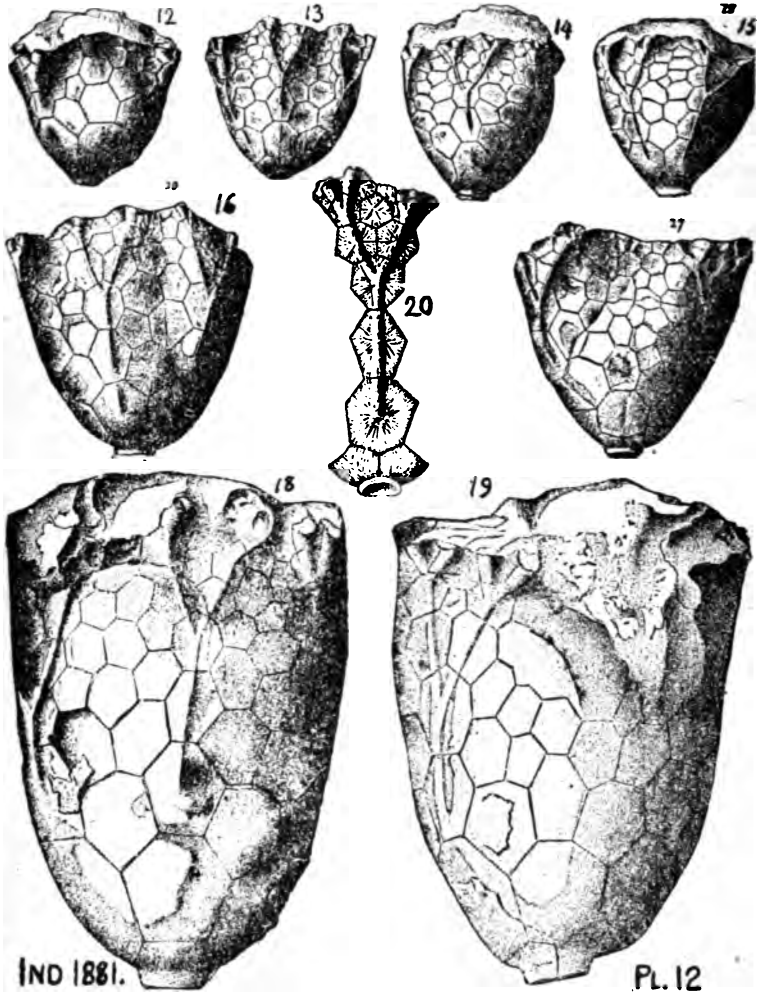
AND ELSEWHERE.

VOLUME 3.

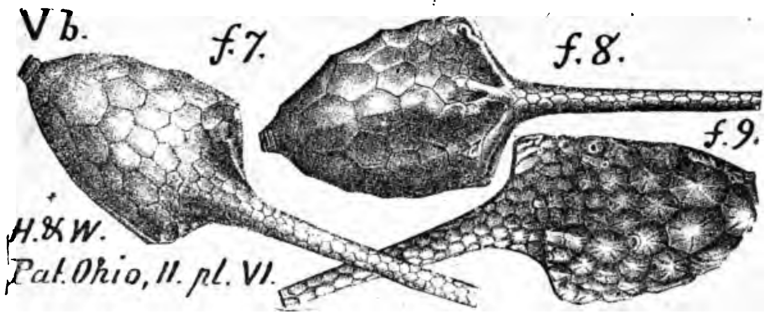
Saccocrinus christyi, Hall. (*Actinocrinus christyi* of Hall, 1863, not of Shumard, 1855; *Actin. Whitfieldi*, Hall, 1868; 1870; *Saccocrinus christyi*, M. & W. 1868; *Megistocrinus marcouanus*, W. & M. 1866; *M. infelix*, W. & M. 1866.) 28th An. Rt N. Y. St. Mus. 1879; also in Collett's Ind. Rt. 1881, page 254, pl. 15, fig. 3, showing the mode of bifurcation of arms, etc.; fig. 4, summit of a specimen partially encrusted with *Lichenalia*. Also, plate 12, fig. 1 (X2), *enlargement* of anal side of small one, showing the fewness of anal plates; 13, front side of larger one, with perfectly preserved striæ; 14, 15, right and left of another; 16, front of a still larger one; 17, hind side, with more plates than in 12; 18, 19, front and anal sides of large specimen, somewhat obscured by attached *bryozoa;* 20, a ray of fig. 13 *enlarged* to show striæ. It has some resemblance to *Actinocrinus specosus*, Hall, Pal. N. Y. Vol. 2, plate 46, f. 1. *Niagara*, in Ohio. *V b.*



Saccocrinus christyi.—*Continued.*

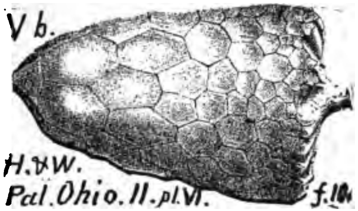


Saccocrinus ornatus, Hall & Whitf. Pal. Ohio, Vol. 2, 1875, page 126, plate 6, figs. 7 and 8, anal and front views of an internal cast of the body and proboscis; 9, hind-side of a gutta percha cast of the mold left by the cast, showing therefore the surface structure of the plates of the left backside ray and anal area; what is left of the column shows that it had alternate large and small discs. Species differs materially from *S.*


Vb.
f.7.
f.8.
f.9.
H.&W.
Pal. Ohio, II. pl. VI.

speciosa, Hall, N. Y. *Niagara;* also from *S. christyi*, Hall, and *S. tennesseensis*, Troost, *two* arms to the ray at the top of the cup, instead of *four*. Yellow Springs, Ohio. *Niagara. Vb.*

Saccocrinus tennesseensis (*Actinocrinus tennesseensis*, Troost, MS.) Hall and Whitfield, Pal. Ohio, Vol. 2, 1875, page 125, plate 6, fig. 10, internal cast, showing front and left foreside rays, with central interradial area. Dome seems to have been composed of many small plates, with no definite order. Yellow Springs, O. *Niagara. Vb.*

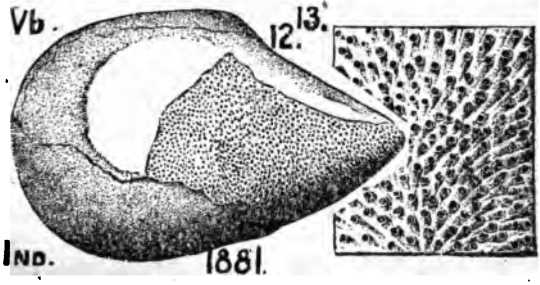

Vb.
H.&W.
Pal. Ohio. II. pl. VI.
f.10.

Sagenaria aculeata. Europe. See **Lepidodendron aculeatum.** *XIII.*

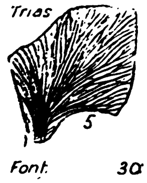
Sagenaria cordata. Europe. See **L. aculeatum.** *XIII.*

Sagenaria rimosa. Europe. See **Lepidodendron rimosum.** *XIII.*

Sagenella elegans, Hall, Doc. Edit. 28th Rt. St. Mus. 1876; Mus. Ed. 1879; in Collett's Indiana Report of 1881, page 242, plate 6, fig. 12, an *Ambongchia acutirostra* left valve encrusted with this membrana-

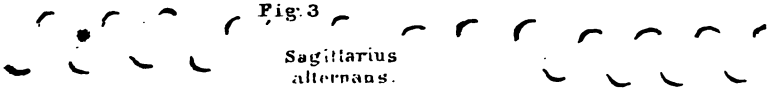


ceous *bryozoon*, its tubular cells and their apertures being shown *enlarged* in fig. 13. (Comp. *S. membranacea*, Hall, Pal. N. Y. Vol. 2. p. 172, plate 40 E, fig. 6 *a*, *b*.) (Cells rounder and more upright than in *Ceramopora;* procumbent part of cell tube longer and epitheca more persistently adherent than in *Lichenalia*. Hall.) Waldron, Ind. *Niagara*. *V b.*



Saginopteris rhoifolia ? Presl. Fountain's Monograph, U. S. Geol. Survey, Vol. 6, 1883, page 63, plate 30, fig. 5, one small fragment only found at Clover Hill, Va., but sufficient to prove the existence of the common European *Rhætic* genus. Same as the N. Carolina *Cyclopteris obscurus*, Emmons, Amer. Geol. pl. 4, fig. 10. *Trias.*

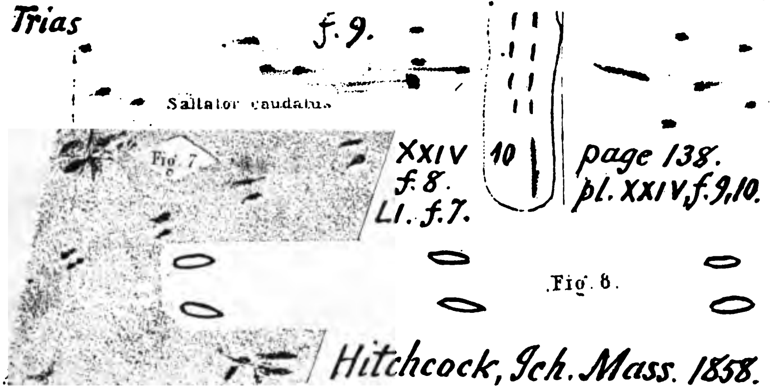
Sagittarius alternans, *tracks.* Hitchcock, Suppl to Ich. Mass. 1865, page 16, plate 6, fig. 3; and regarded as the track of an insect; two parallel rows of curved prints, lightly impressed; a photograph on plate 18, fig. 5, is omitted. *Trias.*



Sagittarius —— ? Track found by C. H. Hitchcock at the Milford quarries on the Delaware, three miles from the South Mountain, and therefore in the *upper sub-division* of the *Trias formation*. (MS. letter Dec. 18, 1888.)

Salisburia adiantifolia ? Rogers. Geol. Pa., 1858, page 830, plate 20. See Balfour's note, page 884. *Catskill. IX.*

Saltator bipedatus, *tracks.* Hitchcock. Ich. Mass. 1858,



Hitchcock, Ich. Mass. 1858.

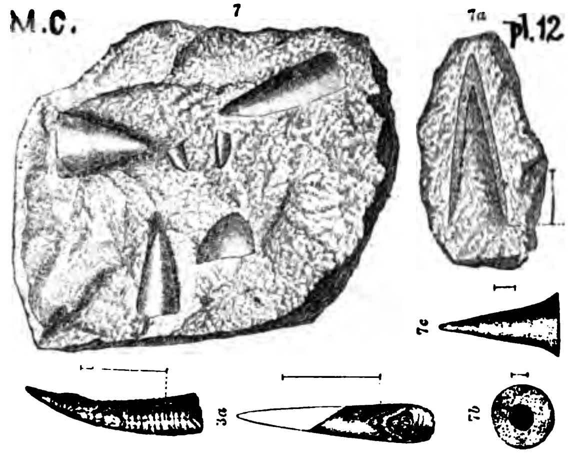
page 137, plate 24, fig 8. the only specimen in the Amherst Museum. (See ambrotype of the whole slab, *reduced in size*, plate 51, fig. 7). Looks like the tracks of a mouse or squirrel leaping along in fresh snow; possibly prints of two toes on one foot; but no trace is seen of another foot; whether the track was of quadruped, or insect cannot be divined (H.) *Trias.*

Saltator caudatus, *tracks*. (Fig. with *S. bipedatus*, above.) Hitchcock, Ich. Mass. page 138, plate 34, fig. 9, *natural size*, best specimen in Amherst; 10, another, smaller, perhaps a different species; nature of creature unknown; possibly an insect, as in one group there are five imprints apparently at rest; compare perhaps a track of the black cricket. *Trias.*

Salterella (?) billingsi. (Safford's Geol. Tennessee, page 289, 1869.) Walcott. Bull. No. 30, page 144. *Trenton. II c.*

Salterella pulchella. Billings. (1861, Geol. Vt. ii, 955; Pal. Foss. 1865, i, 18) Walcott, Bulletin U. S. G. S. No. 30, page 144, plate 12, fig. 7, 7*a*, casts from "the red rock" at Highgate Springs, Vt.; 7*b*, *c*, from Winooski marble, Swanton, Vt. Plate 13, fig. 3, side view of a pebble in Point Levis lime conglomerate; fig. 3 a, another showing aperture and one of the inner tubes. *Lower Cambrian* (*Georgian*) *L. C.*

M.C.

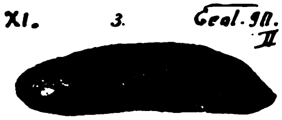


Salterella rugosa, Billings. Geol. Vermont, fig. 362; Pal. Foss. Vol. 1, 1861. Geology of Canada, 1863, page 285, fig. 292, a group of annelids (worm casts) on a slab assigned by Logan to the *Potsdam*

M.C. 13

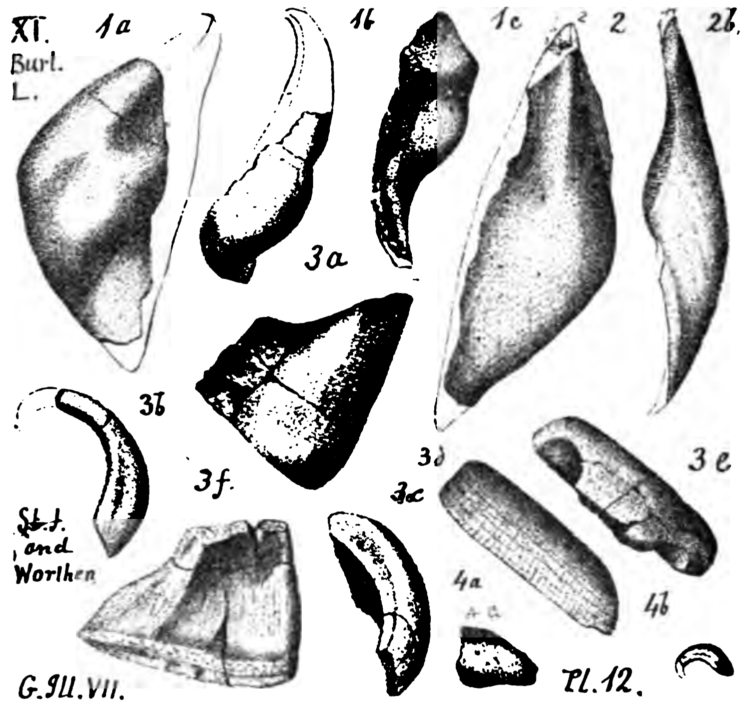
division of his *Quebec group*. *I.* — Walcott. Bull. 30, U. S. G. Sur., page 145, plate 13, fig. 2, enlarged. *Cambrian*. *C.*

Sandalodus angustus, Newberry & Worthen, Geol. Ill. Vol. 2, 1866, page 103, plate 10, fig. 3. From the *Keokuk* (*subcarboniferous*) *limestone*. *XI.*



Sandalodus carbonarius, Newberry & Worthen, Geol. Ill., Vol. 2, 1866, page 104, plate 10, fig. 4 a, a fish tooth of the *Coal measures* of Illinois. Fig. 5, opposite side of larger tooth. *XIII.*

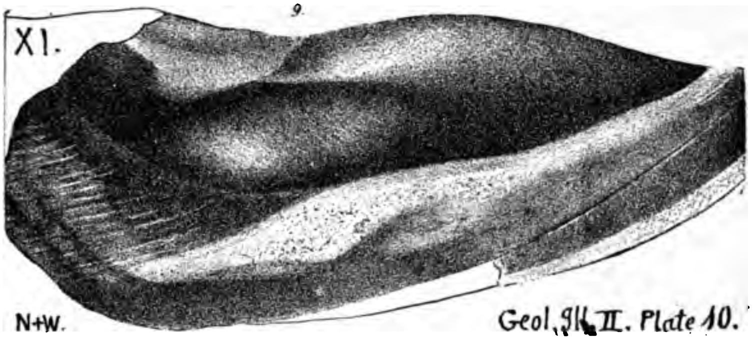
Sandalodus complanatus, St. John & Worthen, Geol. Ill.



Vol. 7, 1883, page 184, plate 12, figs. 1 *a*. upper back tooth left jaw; *b*, front side border; *c*, inner edge; 2 *a*, lower back tooth, right jaw, crown; *b*, long profile from front side border; 3 *a*, large middle upper left tooth; *b*, hind side edge; *c*, front side edge; *d*, inner; *e*, outer margins; *f*, concave lower surface; 4 *a*, *b*, small specimen. From *Upper Burlington* (*subcarboniferous*) *limestone*, Iowa. *XI.*

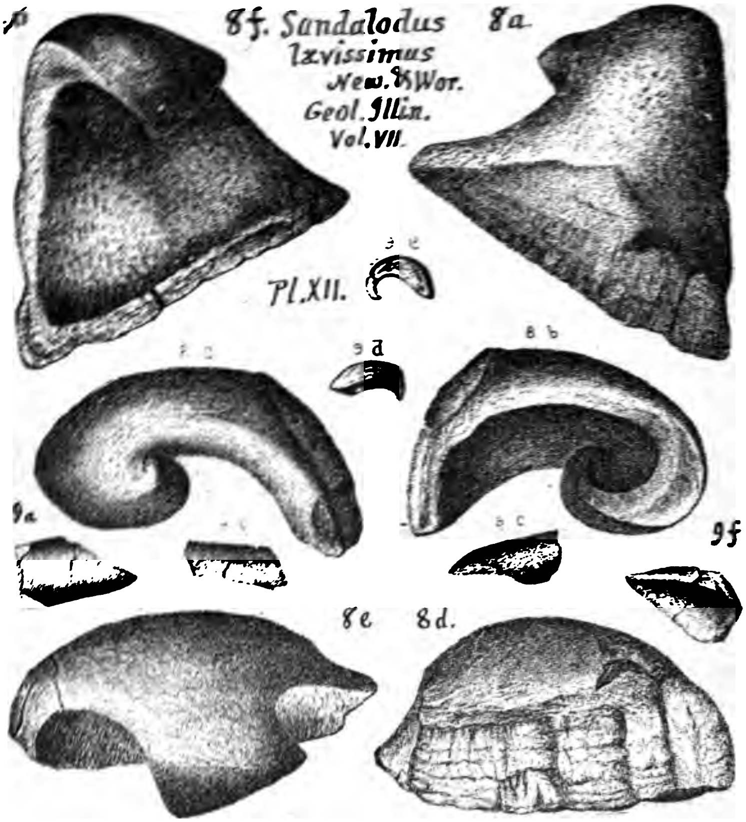
Sandalodus crassus, N. and W. Geol. Ill. IV, 369, pl. 4, f. 3. Newb. Mon. XVI, U. S. G. Sur. 1889, pl. 21, f. 6–8, (*See Appendix.*) *St. Louis limestono. XI.* (Not *S. spatulatus.*)

Sandalodus grandis, Newberry & Worthen Geol. Ill., Vol. 2, 1866, page 105, plate 10, fig. 9, tooth of a large fish of the *Keokuk* (*subcarboniferous*) *limestone. XI.*



Sandalodus laevissimus, Newberry & Worthen, Geol. Ill., Vol. 2, 1866, page 104, plate 10, figs. 6, 7, 8, and Vol. 7, 1883, page 186, plate 12, figs. 8 *a*, middle upper right tooth of a very large fish of this species, most of the crown used up and worn smooth; *b*, back side border; *c*, front side border; *d*, inner and *e*, outer (enrolled) margins; *f*, inferior aspect showing enrolled outer end; 9 *a*, small specimen, left jaw crown; *b*, inner; *c*, outer; d, front side; *c*, back side, borders; f, lower surface. *Keokuk limestone. XI.* (*For figs. see p.* 922.)

Sandalodus parvulus, Newberry & Worthen, Geol. Illinois, Vol. 2, 1866, page 102, plate 10, fig. 1, upper surface or crown of the tooth; 1 *a*, profile view. From the *St. Louis limestone* (*subcarboniferous*) on the Mississippi. *XI.*

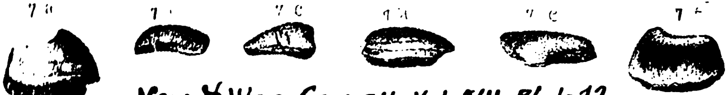


8f. Sandalodus lævissimus New.&Wor. Geol. Illin. Vol. VII.

Pl. XII.

Sandalodus spatulatus, Newberry & Worthen, Geol. Ill., Vol. 2, 1866, page 103, plate 10, fig. 2; also Vol. 7, 1883, page 188, plate 12, figs. 7 a, to 7 f. *St. Louis limestone. XI.*

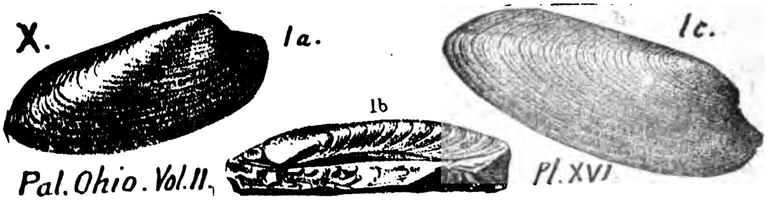
XI kL L.



New.&Wor. Geol. Ill. Vol. VII. Plate 12.

Sanguinolites æolus, Hall, Prel. Notice Lamell. Waverly,

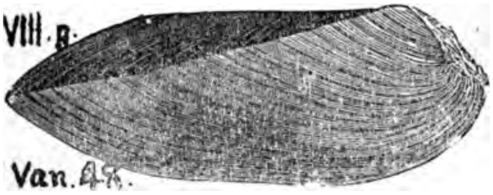
X.



Pal. Ohio. Vol. II, Pl. XVI

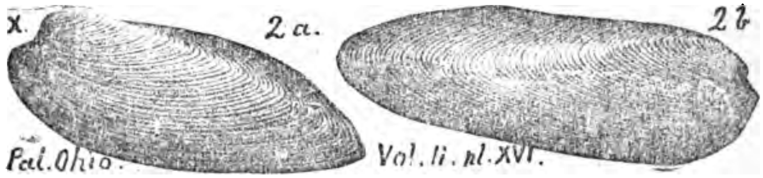
1870. Pal. Ohio, Vol. 2, 1875, page 307, plate 16, fig. 10, *a*, *b*, right side, and dorsal view of internal cast; *c*, right side of another. Related to *S. obliquus*. *Cuyahoga* shale (part of *Waverly* or *Pocono* formation) in Medina Co., O. *X*.

Sanguinolites chemungensis (*Cypricardites chemungensis.*) Vanuxem, Geol. N. Y. 1842, page 179, fig. 48, 2. *Chemung.* In Pennsylvania, Perry Co., Penn township near King's mill, Spec. 12,439, from top beds of *Chemung formation. VIII g.*


VIII.g.
Van.48.

Sanguinolites clavulus, Hall. Prelim. Nat. Lam. 1870. *Chemung.* (See **Sphenotus clavulus,** Hall.)—In S. W. Pennsylvania recognized by Stevenson in Devonian rocks. (K3, p 311.) *VIII-IX.*

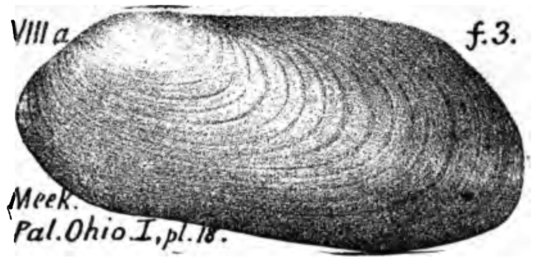
Sanguinolites ? obliquus, Meek, Proc. Acad. Nat. Sci. Philada. 1871.—Pal. Ohio, Vol. 2, 1875, page 306, plate 16, fig. 2*a*, left hand view of external cast; *b*, right side view of a larger specimen. So near *S. aeolus* as to be easily mistaken for it; but its umbonal slopes are more convex and more angular; its beaks nearer the end; the bend of its hinge margin wider; and with no visible the two or three obscure ridges above the umbonal angle of each valve, etc. Shells like this may prove to be no *Sanguinolites;* but they are still less *Allorisma*. Rushville and Newark, O. *Upper Waverly. X.*



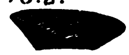
Sanguinolites plicata. (*Cypricardella plicata*, Hall, Trans. Alb. Inst. Vol. 4, 1856. *Goniophora plicata*, Whitfield, Bull. 3, Am. Mus. 1882, plate 7, fig. 39.) Collett's Indiana Report, 1882, page 341, plate 30, fig. 39, *enlarged three times*, side view of type.—Spergen Hill. *Subcarb. XI.*

Sanguinolites rigidus (*Cypricardia rigida.*) White and Whitfield. Proc. Bost. S. N. H., 1862, *Kinderhook limestone. XI.*—[This has been separated by Hall, as **Sphenotus rigidus,** under which name, below, this figure is given.] In S. W. Pennsylvania Stevenson's list of Devonian fossils. (K3, 311.)

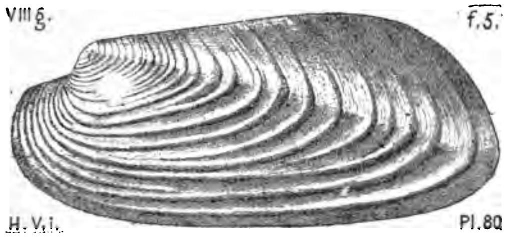
Sanguinolites ? sanduskiensis, Meek, Proc. Acad. Nat. Sci. Phil. 1871.—Pal. Ohio, Vol. 1, 1873, page 209, plate 18, fig. 3, *natural size*, left side of a cast; hinge unknown, and therefore genus doubtful; in fact the genus *Sanguinolites* has no satisfactorily accepted type species, and too little is known of their interior; but the genus ought not to be confounded with King's *Allorisma*, although some *S.* species may hereafter have to be placed under *Allorisma.* (Meek. 1873.) Dublin, Franklin Co. O. *Corniferous. VIII a.*



Sanguinolites truncatus. (*Cypricardites truncatus*). Hall, page 196, fig. 78,8. *Hamilton.* (Conrad, Journ. Acad. Nat. Sci. Phila., Vol. 8, 1842, page 244, plate XXXII, fig. 17. Phillips, Geol. Yorkshire.)—In Perry Co., Pa., Barnett's mill. spec. 11661 (missing. G.B.S.) from *Hamilton upper shale. VIII c.*



Sanguinolites undatus (*Orthonota undata; Sphenotus ? undatus.*) Hall, Pal. N. Y. Vol. V, part 1, p.—, pl. 80, fig. 5. *Chemung.*—In Pennsylvania, Perry Co., Kings mill, spec. 12,456, in *Chemung-Catskill. VIII-IX.*

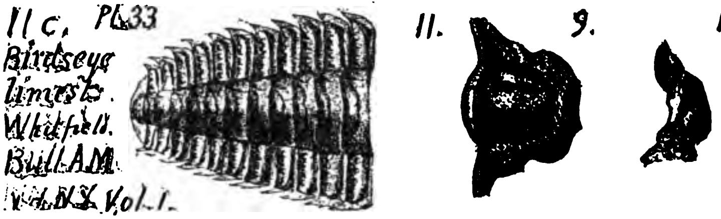

VIII g.
f.5.
H. V. I.
Pl. 80

Sanguinolites ventricosus, White and Whitfield. Proc. Bost. Soc. Nat. Hist, 1862, *Chemung and Kinderhook.*—In S. W. Pennsylvania, Stevenson's list of Devonian fossils (K3, 311.)—

In Perry Co., Middleridge, New Bloomfield, spec. 11,946, from *Chemung. VIII g.* — (*See* **Spathella typica,** Hall, *with figure below;* and **Spathella ventricosa,** Hall, also with figures.) —*VIII g.*

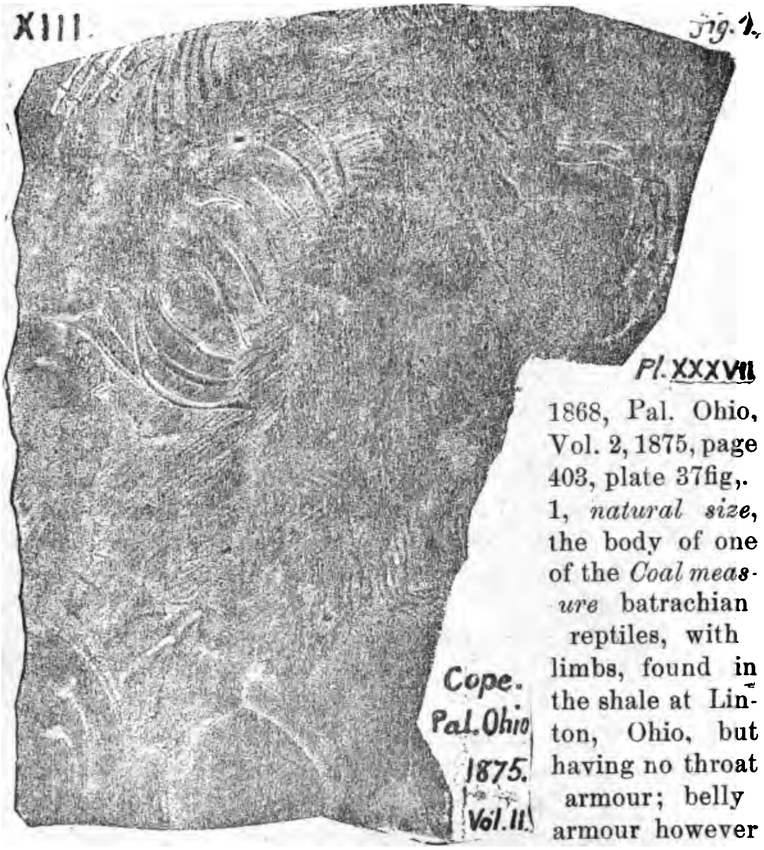
Sanguinolites ——? in *Portage sandstone, VIII f,* in Bedford Co., Pa., in bed No. 18 of the Saxton section, 1000′ under *Chemung lower conglomerate* (T2, 80.)—In *Chemung* brown sandstone, *VIII g,* at Colvin's cross roads, Napier township (T2, 117); and covering the surface of flaggy sandstone at the run just north of Nycum S. H., Monroe township (T2,212.)—In *Chemung upper* (bed No. 14 of Fiedler Creek section, L. Mahanoy, Northumberland Co., (G7, 367.)—In *Chemung Catskill, VIII–IX,* Kings mill, Perry Co., spec. 11,989.—In *First Oil Sand* (*Hosmer run conglomerate*) *IX,* Spring creek, Johnson's saw mill, Warren Co. (IIII, 255.)—In *Pocono sandstone, X,* 450′ beneath the bottom of *Olean conglomerate,* in Allegheny river section at Great Bend, (IIII, 302)—In *Garland* (*Olean, Pottsville*) *conglomerate, XII.* Johnson's sawmill, Spring Creek, Warren Co. (III, 30, 32.)—*VIII f* to *XII.*

Sao ? lamottensis, Whitfield, Bull. Amer. Mus. Nat. Hist. N. Y. Vol. 1, No. 8, 1886, page 334, plate 33, fig. 9, *enlarged* view of glabella and fixed cheeks; 10, outline profile of same; 11, *enlarged* thorax portion of the trilobite; six large pustules on the center piece of the head (glabella proper) three on each side, and three on each fixed cheek, two behind one in front of the eye ridge; over the rest of the surface smaller pustules scattered. One hypostoma has been found, quite like *S. hirsuta,* (Barr. Syst. Sil. Bop. Vol. 2, pl. 7, fig. 21,) from which the whole animal however differs much. Next ally is *Acidaspis.* Heads three times as large as the one figured recently found. Head shields extremely abundant scattered through dove colored "*Birdseye limestone*" layers at Isle Mine la Motte; also at Fort Cassin, Vt.—*Calcif. II a.*

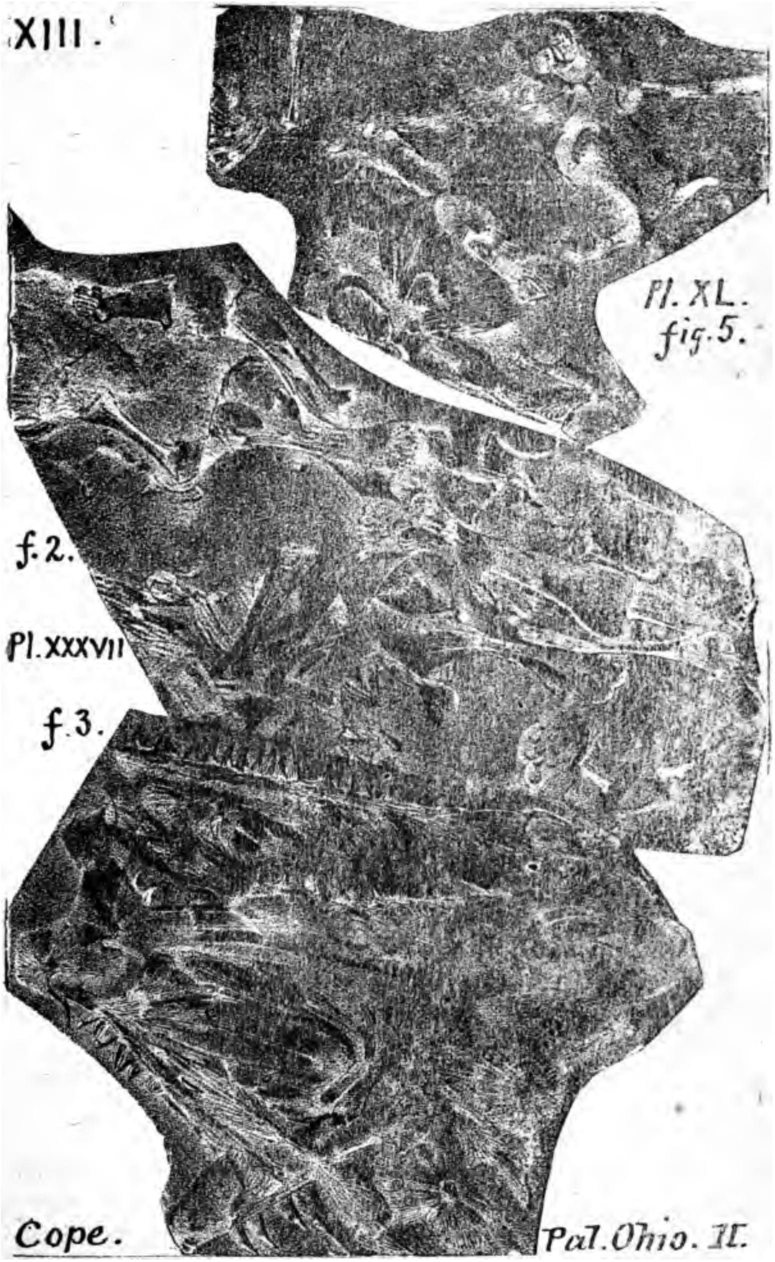


Sauripterus taylori. Hall. See **Holoptychius taylori.** (I, 102.) *IX.* The shoulder girdle, pectoral fins, and scales, on which Hall founded his genus, were found near Blossburg, Tioga Co., Pa., and are now in the Am. Mus. Nat. Hist. Central Park, N. Y. Dr. Newberry has verified Hall's description, adding that the pectoral fin was probably partly scaled like *Holoptychius;* the scales similarly sculptured; the jaws set with conical, compressed, striated teeth, like Leidy's *Apedodus*, the dentary surface finely granulated, and the general structure of the fish essentially like *Holoptychius.* (Mon. XVI of U. S. G. Survey, p. 113, 1889.)

Sauropleura digitata, Cope. Proc. Acad. Nat. Sci. Phila. 1868, Pal. Ohio, Vol. 2, 1875, page 403, plate 37fig,. 1, *natural size*, the body of one of the *Coal measure* batrachian reptiles, with limbs, found in the shale at Linton, Ohio, but having no throat armour; belly armour however



Sauropleura newberryi. See page 928.

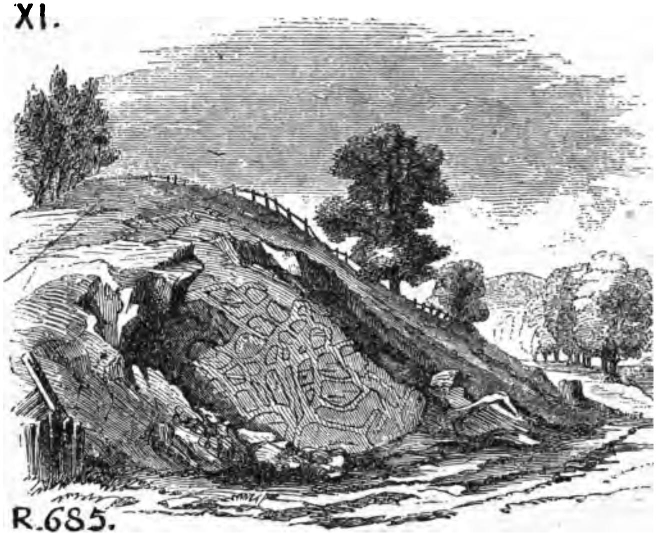


is visible in this specimen, which is the only one of this species found (1875); two oblique bands of oat-shaped scales unite along the back as in *Oestocephalus;* fore-hand has five fingers, with features like the Salamanders, and of higher type than *Amphibamus;* long, curved ribs attached to short vertebræ; enough of the hind limbs visible to show that they were considerably longer than the arms. (See Cope's description.) *XIII.*

Sauropleura newberryi, Cope, Pal. Ohio, Vol. 2, 1875, page 404, plate 37, fig. 2, *nat. size*, limb bones and abdominal skin plates (scutella); 3, skull, destitute of the surface layer, seen from above; plate 40, fig. 5, third specimen, hind part of skull, teeth, loose abdominal scutella. See Cope's description of this long limbed lizard-like batrachian reptile, one of the larger species discovered in the shale of the Linton, O., cannel *coal bed. XIII.*

Sauropleura pectinata. See **Ptyonius pectinatus.** Cope. *XIII.*

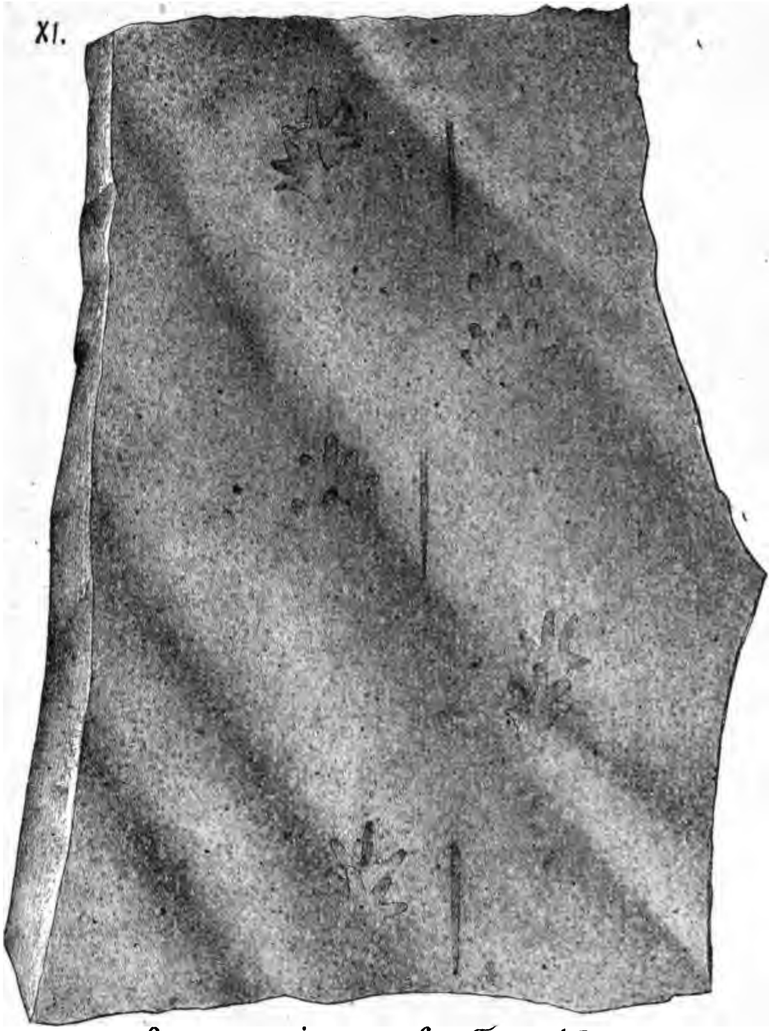
XI.



R.685.

Sauropus primævus. (Reptile foot print discovered by Dr. Isaac Lea, of Philadelphia, and described in Transactions Amer. Philos. Soc. Phila. Vol. X, 1849.) Rogers, Geology of Pennsylvania, 1858, page 831, fig. 685, showing the exposure of red shale at the Mount Carbon hotel, a mile south ot Pottsville, where the foot-prints, mud cracks, etc., were to be seen when described by Lea. The page cut opposite is from G. B. Simp-

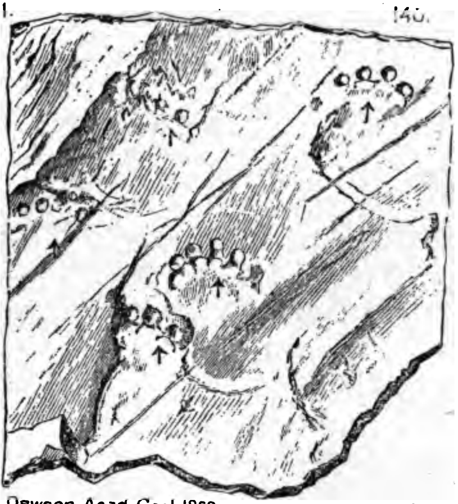
XI.



Sauropus primævus, Lea. Trans. A.P.S.

son's reduced copy of Lea's tinted lithograph of the foot-prints. A still smaller reduction may be found in Dana's Manual Geol. 3d ed. 1880, page 302. Six steps are seen on a slab five feet long, each step double, the hind foot always stepping upon the imprint of the fore foot. Print of fore foot like that of a hand, with five stout fingers, four inches broad; hind foot, with four fingers, a little smaller. Length of stride fourteen inches; breadth of whole track, from outside to outside. eight inches. Trail of tail, one inch wide. Ripple marks 8 or 9 in. apart, partly obliterated by foot-prints. Whole surface of slab covered with prints of rain drops from a shower which fell after this large lizard (?) like animal had passed over the muddy margin of some lake or sea in the age immediately preceding the formation of the *Pottsville conglomerate* with its included coal beds. *Mauch Chunk red shale. XI.*

Sauropus sydnensis. Dawson, Acadian Geology, 1868, page 358, fig. 140, *reduced to one-fifth*, foot-prints of a lizard of the *Coal measures* of Sydney, Cape Breton, found by W. Brown, now in the McGill College Museum, Montreal. See *notes under* **Dendrerpeton acadianum.** *XIII.*



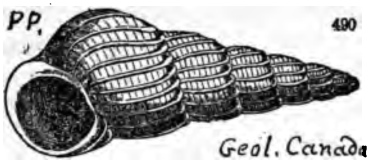
Dawson .Acad. Geol. 1868. p. 358.

Sauropus unguifer, Dawson, Geo. Mag. Lond. Vol. 9, 1872. *Coal Measures, XIII.*

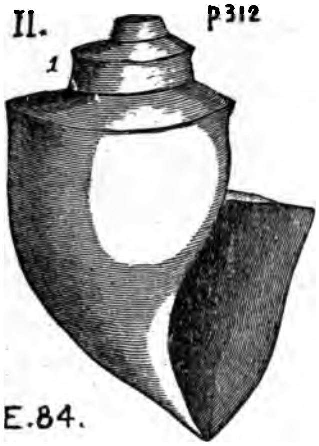
Saxicava rugosa, Linn. (*Saxicava distorta,* Say.) Dawson's Acadian Geology, 1868, page 74, fig. 15; over boulder clay at St. John; famous shell of the Ice age, at its close; figured also in Geology of Canada, 1863, page 964, fig. *a*, *b*, two sizes, as found in the *Champlain clay* of Canada. *Post-pleiscene, PP.*

Geol. Canada 1863.

Scalaria grœnlandica, Perry. An Arctic shell found in the late glacial *Champlain clay* of Canada. Geol. Canada, 1863, page 964, fig. 490. *Postpleiscene. PP.*



Scalites angulatus. Emmons, Geology of the Second District, N. Y., page 312, fig. 84. *Chazy formation. II b.*



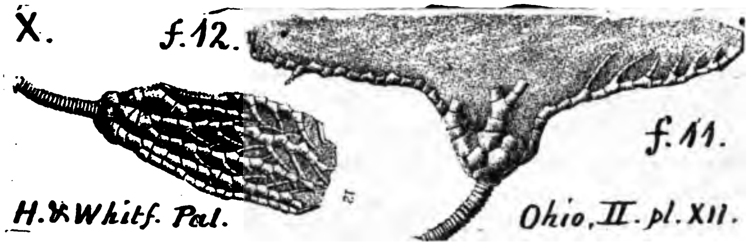
Scalites planistria. See **Raphistoma planistrium.** *IIa*, *IIb.*

Scalites tropidophora. See **Pleurotomaria tropidophora.** *III b.*

Scalops. A mole's bone was found in the Port Kennedy cave earth. See Cope, in Proc. A. P. S. 1871, p. 95.

Scaphaspis and *Pteraspis*, generic names given by Huxley and Lancaster to the earliest known fishes in the upper and middle beds of the Upper Silurian in Europe, where Claypole found his spines and plates in Perry Co., Pa. See **Onchus.** In opposition to such authorities we may safely object to accepting without further discoveries the opinion that they were not fishes, but crustaceans. Dr. Newberry states the case in Mon. XVI, U. S. G. Survey, 1889, page 19.

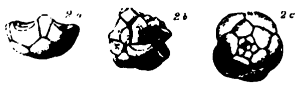
Scaphiocrinus ægina, (*Poteriocrinus ægina*, Hall, 17th.


X.
f.12.
f.11.
H.&Whitf. Pal.
Ohio.II.pl.XII.

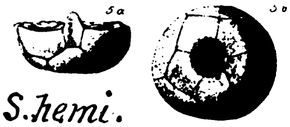
Rept. Desc. New Crin. Waverly, 1863.) Pal. Ohio, Vol. 2, 1875, page 174, plate 12, fig. 11, the anal side and parts of three rays of an imperfect specimen; 12, well preserved specimen, showing structure of armbases, and form of plates of arms and tentacles. Looks like and closely related to *Pot. diffusus* of the *Hamilton*, but has shorter body and plates, and each arm-joint bears tentacles, instead of every second or third one. In Ohio there are 2000 feet of sediments, and in middle Pennsylvania at least 5000, between the horizon of the *diffusus*, and that of the *ægina*, in the *Pocono* (*Waverly*) *formation*, *X.*

Scaphiocrinus carbonarius, Meek and Worthen Proc.

XIII



Geol. Ill. V, 1873, Pl. 24.



S. hemi.

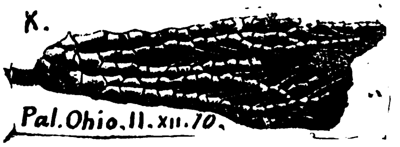
Acad. Nat. Sci. Phila. 1861.—Geo. Sur. Ill., Vol. 5, 1873, page 562, plate 24, figs. 2*a*, 2*b*. *Coal measures. XIII.*

Scaphiocrinus corycia. See **Poteriocrinus corycia.** *X.*

Scaphiocrinus hemisphericus, *Poteriocrinus hemisphericus*, Shumard, Trans. St. Louis Acad. Sciences, 1858). Meek and Worthen, Geol. Ill. Vol. 5, 1873, page 561, plate 24, figs. 5*a*, 5*b*, (which see under **S. carbonarius** above.) *XIII.*

Scaphiocrinus liriope, *Poteriocrinus lyriope*, Hall, 17th Rept. Desc. Crin. Waverly Sand. 1863.—Pal. Ohio, Vol. 2, 1875, page 175, plate 12, fig. 9, specimen from Richfield, Summit Co., O., from *Waverly shales. X.*

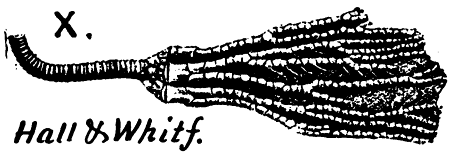
X.



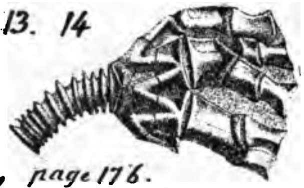
Pal. Ohio. II. XII. 10.

Scaphiocrinus subcarinatus, Hall, 17th Report, N. Y.

X.

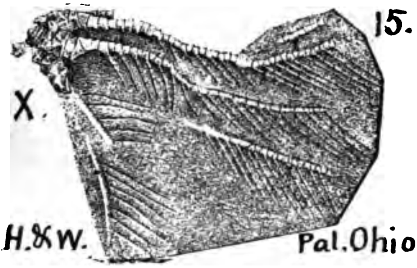


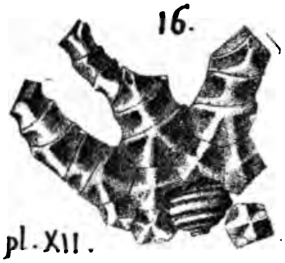
13. 14



Hall & Whitf.
Pal. Ohio, Vol. II, plate XII, page 176.

Crin. Wav. Sand. 1863. Pal. Ohio, Vol. 2, 1875, page 176, plate 12, fig. 13, *natural size*, body, arms, tentacles, and part of stem or column; 14, *enlarged* cup (calyx) and first arm plates and column of another, showing the very unequal joints or discs of it. Closely like *S. carinatus* of the Mississippi Valley *Burlington limestone;* but its arms fork differently; and it has but two instead of three radial plates in a series. Richfield, O, *Waverly shale. X.*

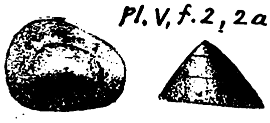




Scaphiocrinus subtortuosus, Hall, Desc. Crin. Wav. sand, 1863, Pal. Ohio, Val. 2, 1875, page 177, plate 12, fig. 15. Imperfect specimen, showing body plates, etc.; 16, *enlarged*, calyx-plates and arm-bases, showing sculpturing. Like *S. tortuosus* of the *Burlington limestone;* but its arms and 3 radial plates in series bring it nearer to *S. carinatus*. Richfield, O. *Waverly shale. X.*

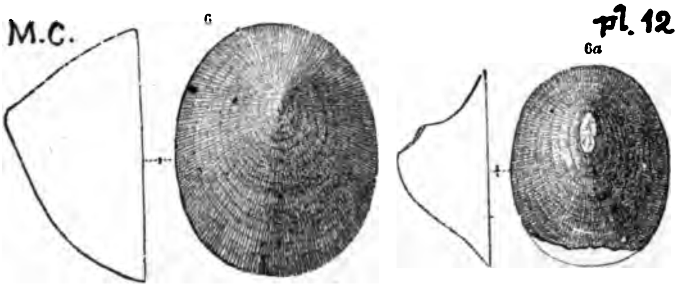
S. tenuidactylus ; S. tethys; S. unicus; S. varsoviensis; S. vetustus; S. whitii; are other western species.

S. tortuosus and *S. wachsmuthi* are now placed among the **Graphiocrini.** (S. A. Miller.)

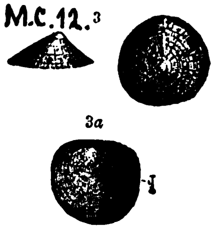


Scenella conica, Whiteaves, Pal. Foss. Canada, Vol. 3, part 1, page 31, plate 5, fig. 2, 2*a*, summit and side views of one out of eight casts of the interior, not very well preserved, closely like (externally) to S. *reticulata* of Billings (*Huronian?);* but the muscular impressions are not known; the genus *Scenella* should be abandoned; all the specimens may perhaps ultimately fall into Whitfield's genus *Lepetopsis.* (Whiteaves.)—At Durham, Canada West, in *Guelph* (*upper Niagara*) *formation. Vb'.*

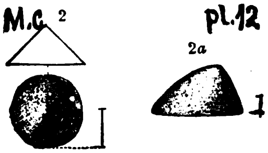
Scenella conula, placed among gasteropods by Walcott,
Scenella elongata, placed among gasteropods by Walcott.
Scenella reticulata. Billings (Can. Naturalist. 1872,



Vol. 6, p. 479) Walcott, Bulletin No. 30, U. S. G. S. page 125, plate 12, fig. 6, 6*a*, *enlarged*, two type (?) specimens from Topsail Head, Newfoundland; associated with *Stenotheca rugosa*, *Iphidea bella*, and *Protypus senectus* in *Lower Cambrian limestone*. *L. C.*

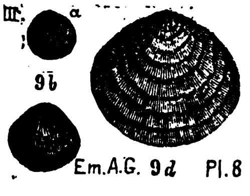


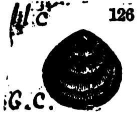
Scenella retusa, Ford (1873, Am. Jour. sci. [3] Vol. 5, p. 213, figs. 2a, b.) Walcott, Bull. No. 30, page 126, plate 12, figs. 3, *enlarged three times*, top and side views of type; 3*a*, top view of another from Troy, doubtfully referred to this species.—*Lower Cambrian*, *L C.*



Scenella ? varians. Walcott, Bull. U. S. G. S., No. 30, page 127, pl. 12, fig. 2, top and side view, concentric axis; fig. 2*a*, side view, excentric axis; from near the Highgate Springs, Vt.; St. Anne, Canada. *Georgian formation*. *L. C.*

Schizocrania (*Trematis*) **filosa.** (*Orbiculoidea*, D'Orb.



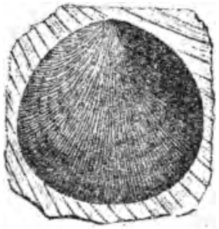


Orbicula ? filosa, Hall, Pal. N. Y., Vol. 1, 1847, Utica and Cincin. groups.) Emmons Am. Geol. I, ii, 1855, p. 200, plate 8, fig. 9*a*, *b*, *d*. Renamed by Hall and Whitfield in Pal. Ohio, Vol. 2, 1875. *Utica* and

Hudson River formations. III a, b. — Logan's Geol. Canada, 1863, page 159, fig. 126, gives *Trematis filosa* as from the *Trenton II c.*—Pal. Ohio, Vol. 2, 1875, page 73, plate 1, fig. 12, *natural size*, showing a shell of *Strophemena alternata* on which grew five lower valves (three of them retaining bits of the upper valve) of this *S. filosa;* 13, *enlarged* upper valve; 14, *enlarged* upper valve, from which the shell has been removed showing muscular impressions; 15, *enlarged* ventral valve, showing the thickened notch-margins. NOTE. Hall says that the shells of *Crania scabiosa*, which are not uncommon, are mostly found adhering to, and conforming their own shape, to the surface of other larger Brachiopod shells. — Cincinnati, O. *Hudson River formation. III b.*

\III

13



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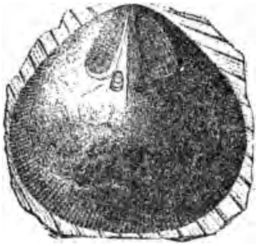

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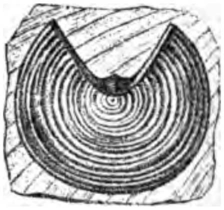


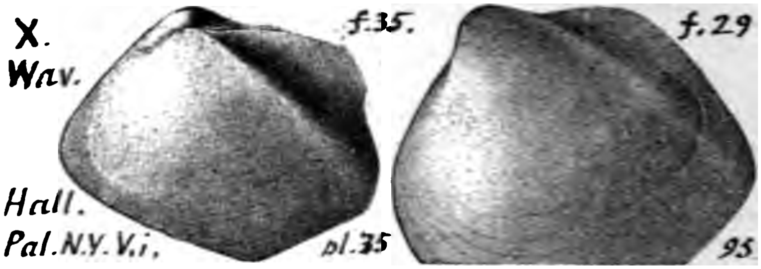
Pal. Ohio. II. pl. 1. 12

H-W.

Schizocrinus nodobrachiatus, Hall. Desc. New Crin. 1861. *Warsaw group* in the West. — *XI.*—Note. This is not given by S. A. Miller under this genus, but under *Scaphiocrinus*, and referred to the *Keokuk.*

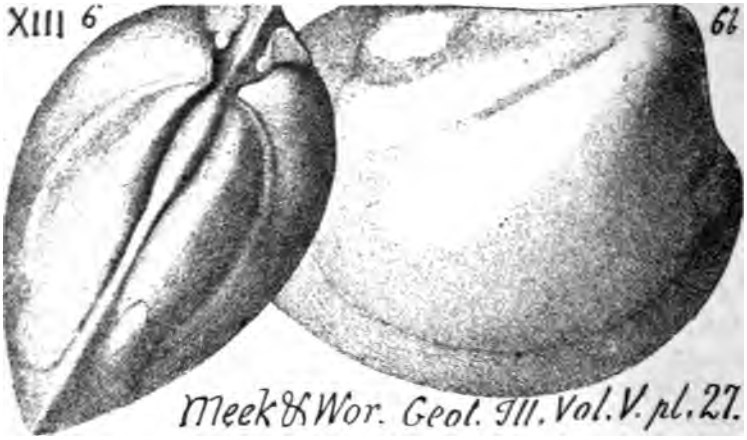
Schizocrinus nodosus, a stone lily, quoted by C. E. Hall and Prof. Ewing, as crowding with its stems some of the uppermost *Trenton beds* in Mifflin, Huntingdon and Centre Cos., Pa., (T3, 367; T4, 424.)—*II c.*

Schizodus æqualis, quoted by C. E. Hall in his special list (OOO, p. 191) as **Cytheroden æqualis**. Spec. 305-5 of Sander's collections at Henrietta furnace, Leathercracker cove, Blair Co., Pa. from *Hudson river slate. III b.*—Hall, Pal. N.

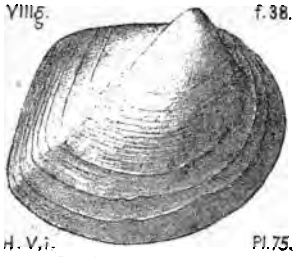


Y., Vol. V, i. 1885, page 459, plate 75, fig. 35, **left side of an imperfect specimen preserving both valves; plate 95, fig. 29,** left side of another. Very like *S. chemungensis*, **var. *quadrangularis*,** but more equilateral. **Granville, Licking Co.,** Ohio, *Waverly* (*Pocono*) *formation. X.* — **[Strangly enough,** it is quoted by C. E. Hall, (OOO, p. 191, **special list) as Spec. 305-5** of Sander's coll. at Henrietta furnace, **Blair Co., Pa., from** *Hudson river slate. III b.*]

Schizodus amplus. Meek & Worthen, Proc. Acad. Nat.


XIII 6
6b
Meek & Wor. Geol. Ill. Vol.V. pl.27.

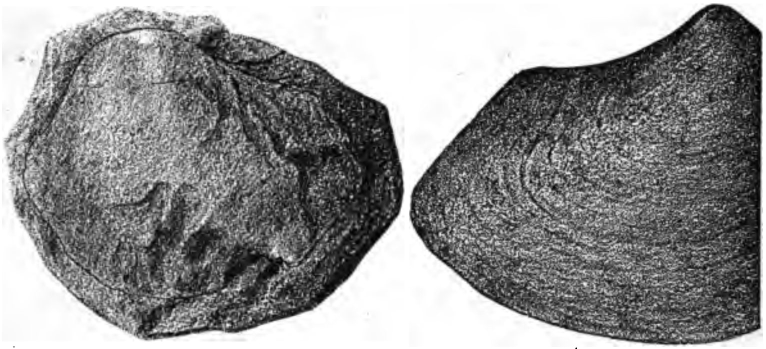
Sci. Phila. 1870. — Geol. Ill., Vol. 5, 1873, **page 579, plate 27, figs.** 6*a*, 6*b*, **dorsal and side** view of an **internal cast, showing** convexity of shell, muscular scars, hinder umbonal satures, etc. In size and outline very near ***Amphicoelia leidyi*, Hall,** from *Upper Silurian* rocks in Chicago; but it must be a ***Schizodus***, and the largest seen; differs from *S. occidentalis*, **Swallow**, from the ***higher coal measures*** at La Salle.—**From Leaville,** Fulton Co., Ill., roof of *Coal No. 1. XIII.*


VIII5.
f.38.
H.V.i.
Pl.75.

Schizodus chemungensis ? (*Nuculites chemungensis*, Conrad. 1842, Jour. Acad. N. S. Phil. Vol 8. *Chemung.*) Claypole's list of fossils found in Perry Co., Pa. Report F2, Preface, xv. *Chemung-Catskill beds. VIII–IX.* Also (doubtfully) at Warren, Pa. Randall's specs. 9581, 9582, 9583 (OOO, p. 29) in his sub-division I, 150′ to 220′ beneath the *Olean conglomerate*, i. e. in *Pocono sandstone. X.*

Schizodus chemungensis, var. **quadrangularis.** See *S. quadrangularis* below. Also, *Cypriodon quadrangularis.*

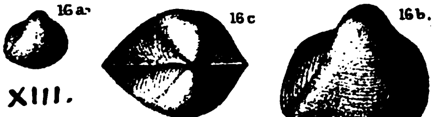
Schizodus cuneatus ? Meek, Pal. Ohio, Vol. 2, p. 336, pl. 20, fig. 7. Geol. Pa. An. Rt. 1885, Heilprin's report on fossils of the Wyoming Valley, pp. 442 and 456, fig. 9, A, from Meek; fig. 9, a cast, 2 inches long, in the collection of the Wyoming Hist. Soc. at Wilkesbarre; identification somewhat doubtful; from *Mill Creek limestone bed*, 1000 feet above *XII*, i. e. in *Barren measures* (*Pittsburgh series*) in anthracite region. *XIV.* Pal. Ohio, Vol. 2, 1875, page 336, plate 20, fig. 7. Probably the *Schizodus* in the *Crinoidal limestone* of the *Barren measures* in S. W. Pennsylvania (H4, 78); but it may be *S. wheeleri.*



Schizodus cuneus, Hall. See Claypole's spec. 12,698 (169–4, OOO, p. 165), Duncan's island, Perry Co., Pa., from *King's mill sandstone. Chemung–Catskill beds. VIII–IX.*

Schizodus curtiformis, Walcott, Mon. U. S. G. Sur. VIII, 1885. *Subcarboniferous.*

Schizodus curtus, Meek and Worthen, Proc. Chi. Acad. Sci. 1866; Geo. Sur. Ill. Vol. 5, 1873, page 582, plate 26, figs. 16, *a*, *b*, *c*, from Wabash cut-off, New Harmony, Ind. and from lime-balls over Illinois *Coal No. 4*. *XIII.*

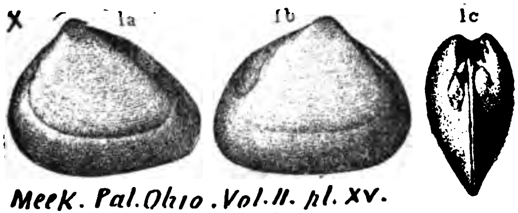


XIII.

Geol. Ill. Vol. V, pl. 26.

Schizodus gregarius, see **Cytherodon gregarius**, Hall, Vol. 5, 1883, plate 75, figs. 41 to 45. *Chemung*. *VIII g*. (OOO. Specimen 11,975 marked *Schizodus rhombeus* is narrow like and perhaps identical with this species. G. B. S.)

Schizodus medinaensis, Meek. Proc. Acad. Nat. Sc. Phila. Vol. 23, 1871. Pal. Ohio, Vol. 2, 1875, page 299, plate 15, fig. 1 *a*, left side of internal cast; 1 *b*, the right side of another cast; I *c*, interior view of an internal cast. It has been supposed to be Conrad's *Nuculites chemungensis* (J. A. N. S. Phila. Vol. 8); but it might better be identified with Swallow's *Cypricardia? wheeleri* (Tr. St. L. A. S., II, 96, 1862)=*Schizodus obscurus*, Geinitz (Carbonf. u. Dyas in Nebraska); which however is more depressed, with lower beaks, and square hinder outline, etc., than *S. medinaensis*. [Meek shows the usual palæontological prejudice, by adding: "As difficult as it certainly sometimes is to separate closely allied species of this genus, I can not think that we ought to refer to the same species forms found occupying such widely different horizons as the Chemung group of the Devonian, and the Waverly group and Coal Measure of the Carboniferous." An archæologist might as well object to the dwarf *Atua* found by the present African explorations being the lineal descendants of the dwarf *Atua* figured and named on a very ancient wall in Egypt.] Medina, O. *Waverly*. *X*.

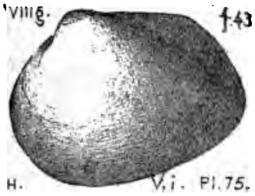


Meek. Pal. Ohio. Vol. II. pl. XV.

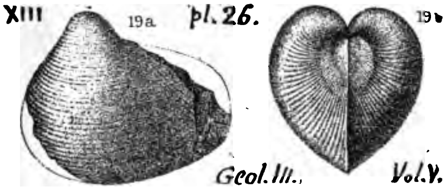
Schizodus oblatus (*Cytherodon oblatus*), Hall, Pal. N. Y. Vol. 5, 1883, plate 75, figs. 41 to 45. *Chemung*. *VIII g*.—Perry

Co. OOO Spec. 12,448 (104–7, all casts, larger than usual in this species, but agreeing with the original description; the hind margin in each case is a little broken, giving it a regularly rounded sweep, easily mistaken for some other genus. G. B. S.) *King's mill sandstone.* *VIII–IX.*

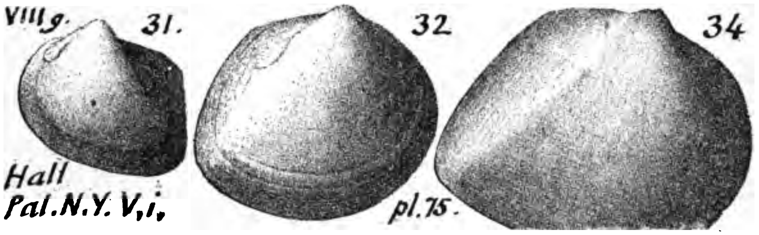
Schizodus oblatus. (Hall, 1870. Prelim. Notice Lamellibranches, *Chemung*) Claypole's Perry Co. Spec. 12,448, *S. oblatus*, and large variety (six), from opposite Shermandale mill, in *King's mill sandstone.* *VIII–IX.*


VIII g.
f. 43
H.
V, i. Pl. 75.

Schizodus (*Prisconia*) **perelegans**, Meek and Worthen, Proc. Acad. Nat. Sci. Phila. 1870. Geo. Sur. Ill., Vol. 5, 1873, page 581, plate 26, figs. 19 *a*, *b*; surface apparently smooth, but under a lens of high power entirely covered with perfectly regular cross-lines close together. Roof shale of *Coal No.* 7, Danville, Ill. *XIII?*



Schizodus (*Cytherodon*) **quadrangularis**, Hall, Pal. N. Y. Vol. V, i, 1885, page 454, plate 75, fig. 31, cast of interior of small left valve, showing scars and pallial line; from Ithaca, N. Y. *Lower Chemung;* 32, partial cast of larger right valve; (33 omitted); Elmira, N. Y.; 34, large right valve, Tioga Co., N. Y. *Chemung.* — In Pennsylvania, Columbia Co., Bloomsburg, Claypole's spec. 12,288, White's Coll. *Chemung.* — Perry Co., Junkin's farm, spec. 12,031 (two spec., one may be this species; the other is more like a much weathered *Edmondia.* G. B. S.) 5 m. S. of N. Bloomfield. *VIII g.* Specimen

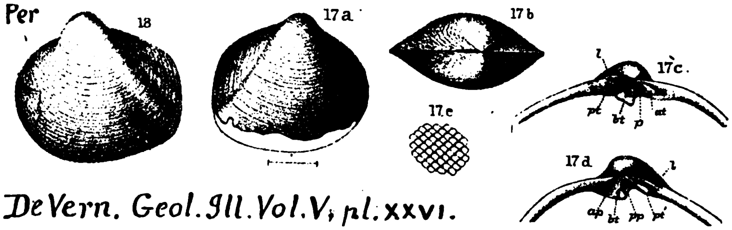


12,284 (OOO, p. 149) is of this species (G. B. S.) from opposite Bloomsburg, Col. Co. *Chemung. VIII g.*—NOTE. *Doubtfully* identified by Heilprin among the Wyoming Valley anthracite fossils in the Museum of the Wyoming Hist. Soc. at Wilkesbarre, Pa. Geol. Sur. An. Rt. 1885, page 451. Possibly Stevenson's *Decker shale Schiroaus* at Morgantown under *Mahoning sandstone. XIII.*

Schizodus rhombeus. See **Cypricardites rhombeus.** *VIII–IX.*—For specimens collected in Pennsylvania, see Catalogue OOO, p. 137, 1889.—Spec. 11,967. (Six pieces each a mass of casts of this species of shell, showing the muscular scars, but no surface, the rock being the sandstone near the conglomerate. G. B. S.); 11,972 (filled with casts); 11,973 (two pieces one of which has a good *Grammysia elliptica*, the other a mass of casts of ~~S.~~ *rhombeus*, G. B. S.); 11,975 (resembles the narrow S. *gregarius*, [*or Cytherodon gregarius*] if not identical with it. G. B. S.); 11,987 (ten casts forming the greater bulk of the sandstone. G. B. S.); 11,989 (a block with several casts and one impression of a *Modiomorpha ?*); 11,990; 12,041 (cast with muscular scars and pallial line); 12,206 (mass of fragments); 12,472 (two); 12,556 (all obscure casts); 12,699 (six); 13,035 (numerous, scarcely recognizable, but a mass of this species, G. B. S.); from various places in Perry Co., and all from the transition beds from *Chemung* to *Catskill*, (*Kingsmill sandstone*, etc.,) except the last which is from *Catskill beds.* Also spec. 12,206, from near Leroy, Bradford Co., from high *Chemung*, or *Chemung-Catskill* beds.—*VIII–IX.*

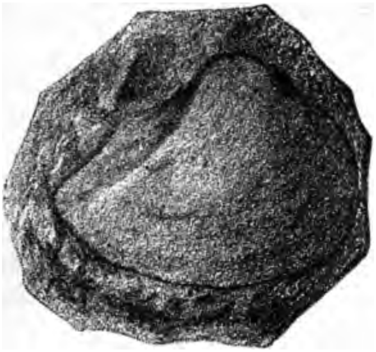
Schizodus rossicus, De Verneuil, Geo. Russ. 1845; M. and

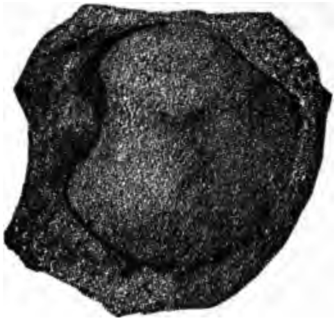
Per



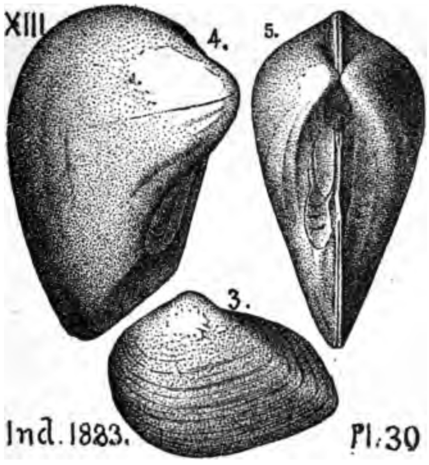
DeVern. Geol.Ill.Vol.V, pl.xxvi.

W., Geo. Sur. Ill., Vol. 5, 1873, plate 26, figs. 17, *a*, *b*, *c*, *d*, *e*; 18.—*Permian or uppermost Carboniferous — XVII–XVIII.*





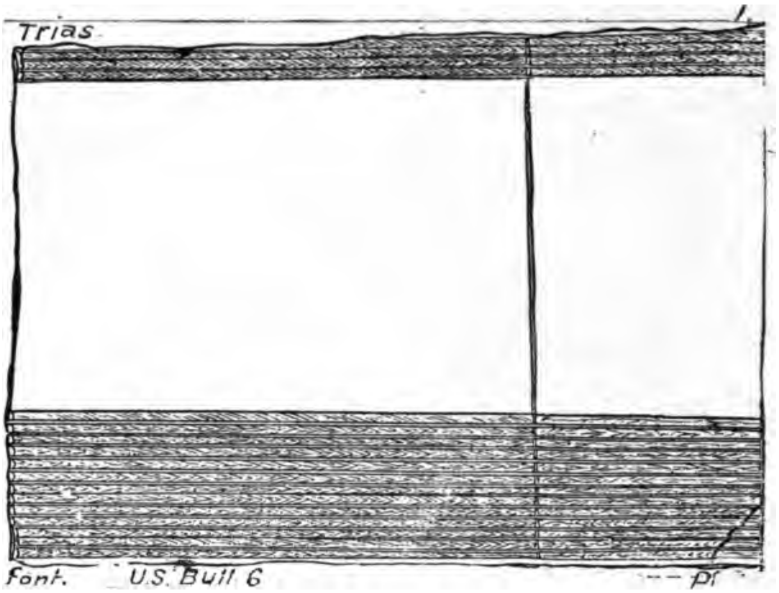
7A SCHIZODUS WHEELERI.



Schizodus wheeleri. (*Cypricardia wheeleri*, Swallow, Trans. St. Louis Acad. Sci. Vol. 2, 1862, p. 96.) Meek, U. S. Geol. Sur. of Nebraska, 1872, page 209, plate 209, plate 10, fig. 1. — Collett's Indiana Rt. 1882, page 147, plate 30, fig. 3, *natural size*, outside of left valve; fig. 4, 5, *natural size* of large cast of inside. XV, Upper Coal Measures; widely distributed from Indiana to Nebraska and New Mexico; usually as inside casts; but is easily recognized. — Several nearly perfect casts in the collection of the Wyoming Hist. Soc. at Wilkesbarre, Pa. Geol. Sur. An. Rt. 1885, pp. 442, 446, figs. 7, 7A in *Mill Creek Limestone*, 1000 feet above the Pottsville conglomerate No. XII; corresponding to the *Great Limestone of the Monongahela series. XV.*

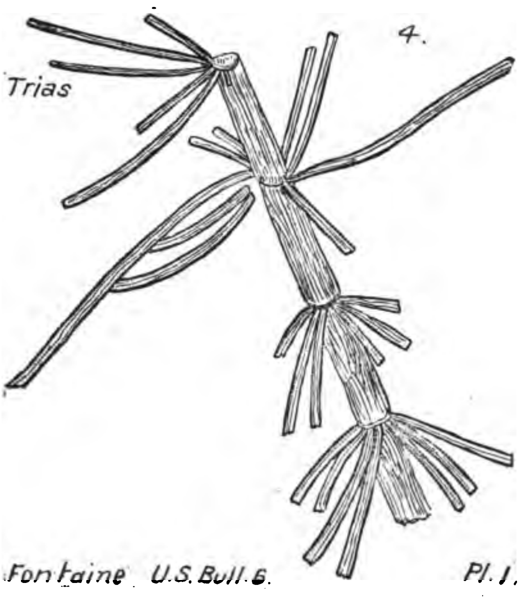
Schizodus —— ? Randall's specimens from Warren, Pa., 9,606, '7, '8, '9, should be *Grammysia communis*. (G. B. S.)

Schizoneura planicostata, Fontaine. (*Calamites planicostatus*, W. B. Rogers.) Mon. U. S. Geol. Sur. Vol. 6, 1883, page 14, plate 1, fig. 1, a flattened cylindrical cast of the interior of a stem 7 inches thick, perfectly preserved in



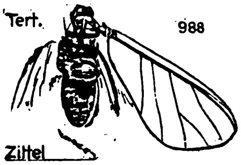
grey sandstone; not uncommon under *Clover Hill main coal and above Bottom seam*, Virginia.— *Trias.*

Schizoneura Virginiensis, Fontaine. Monog. U. S. Geol. Sur. Vol. 6, 1883, plate 1, fig. 4, portion of stem, showing several nodes; leaves of this small plant marked by delicate striations which look like slender nerves. Some resemblance to *Nematophyllum* of U. C. Meas. of W. Va. & S. W. Pa. Like the European *Triassic S. meriani*, *Rhætic S. hoerensis*. Compare also English *Oolitic S. lateralis*.


4.
Trias
Fontaine U.S. Bull. 6.
Pl. 1.

Schimp. (*Equisetum laterale*, L. & H.). — Found only with *Clover Hill main coal*, Virginia.—*Trias.*

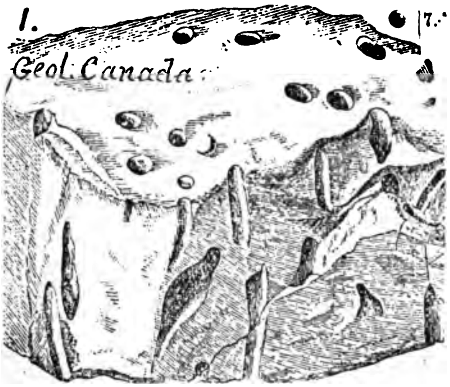
Schizoneuroides scudderi, Buckton. Insect found in the *oligocene tertiary beds* of Florissant, Colorado. Zittel's Handbuch, fig. 988 (*magnified six times.*) — *Tertiary.*



Schizopteris adnascens. English species. See **Rhabdophyllum adnascens.** *XIII.*

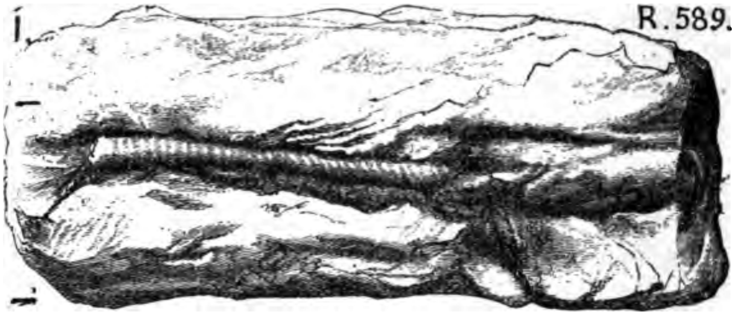
Sciurus calycinus, Cope; two imperfect lower jaws, found in the Port Kennedy cave, Chester Co., Pa. Proc. A. P. S., 1871, p. 86.

Scolithus canadensis, Billings. Pal. Foss. Vol. 1, 1862. Geology of Canada, 1863, page 101, fig. 7. Represents worm-burrows in the shoresand of *Potsdam age.* But the old idea that *Scolithus* characterises and determines the *Potsdam sandstone* must be abandoned. Brainard and Seely (Bull. Geol. Soc. Amer. Vol. 1, 1890, p. 510) have subdivided the great overlying *Calciferous formation* into five divisions, viz: A, B, C, D, E, read from below upward, 1800 feet thick in all. The *Scolithus* "fucoids are not characteristic of any one division, though they appear abundantly in various horizons of D." "The most abundant display we have ever seen is to be found at the bottom of Div. C, six or seven hundred feet above the *Potsdam* sandstone." "The sandstones and sandy limestones of Div. C, and those of the lower part of D, gave the name *Calciferous sandstone* to the formation;" but pure limestone beds are numerous, and are specially abundant in Div. B. [Compare my investigation of the alternate limestone and dolomite beds at Harrisburg, Pa, in Report MM, 1879, pp. 311



to 361. Compare also the "Barrens" of Centre Co. J. P. L.] — *I, IIa.*

Scolithus linearis. (Casts of worm burrows.) — H. D.



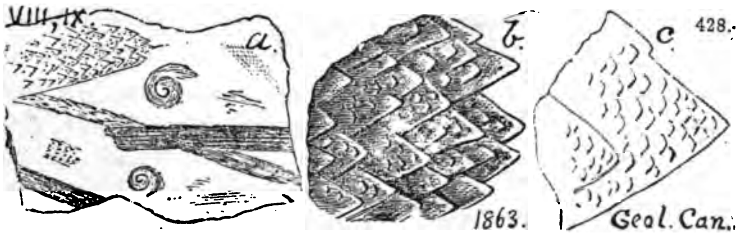
Rogers' Geology of Pennsylvania, page 816, fig. 589. *Potsdam sandstone. I.* Very abundant in the quartzite strata of the bluff at Columbia, Lancaster Co. *Chicques rock quartzite* (O, 183, Spec. 3989.) — In Franklin Co., on Poke hill (South Mountains) opposite Shippensburg (Spec. 4145,); also, 3 and 6 milss northeast of Fayetteville, Cold Spring, in fine grain quartzite, (Specs. 3790, 3804, 3822, 3836); also, 2½ m. northeast of Greenwood, in fine grained sandstone (Spec. 3826); also ½ m. east of Mont Alto furnace, in quartzite (Spec. 1263); also, on Antietam creek, 2½ m. northeast of White mills (Spec. 4170); also, fine specimen in quartzite, from Vineyard ravine, Antietam creek, 5 m. northeast of Waynesboro', (Spec. 4250.) — In the Lehigh Co. S. mountains, *Scolithus* is reported by Prime in Report D2, pp. 8, 9, 27; the whole surface of Lock ridge, northern slope, is covered by *Potsdam sandstone* with abundance of *Scolithus;* well preserved in Seller's quarry, east of E. Penn junction; also at Jessie Kline's mine, in the sandstone under the ore; see also spec. 9165, from *quartzite* on the summit of the mountain ½ m. west of Eshbachville, Washington township, Berks Co. (D3, ii, p. 388). — All the above are found in *Potsdam formation, I.* — Similar worm borrow casts (*Scolithus*) may be seen here and there along the outcrops of the *White Medina sandstone formation, IV;* as, for example, those reported by Stevenson in Evitts mountain, Bean's Cove, Bedford Co., ridge behind Hendrickson's house, on the road from Zembower's mill. (T2,146.) — The finest exhibition of

Scolithus in Pennsylvania has been described by Prof. Atreus Wanner, Principal of York High School, York Co., Pa., in a paper read at the Toronto meeting of the A. A. A. S. 1889, reprinted in the Amer. Geologist, Vol. 5, No. 1, Jan., 1890, page 35, with figures of the universally flattened worm-tube casts, and of a quarry of the *Hellam quarzite* of York Co., the stope wall of which exhibits thousands of them in place vertically penetrating the horizontal beds. This *Hellam quartzite* (so named by Dr. Frazer) is the *Chicques quartzite* of the First Geological Survey, supposed by H. D. Rogers to be the *Potsdam sandstone* of New York and Canada. But Mr. C. D. Walcott of the U. S. Geol. Sur. supposes it to be *Cambrian*. He informed me at the April meeting (1890) of the National Academy, that he had never seen *Scolithus* of this character in the classical *Potsdam*; but that it is everywhere abundant in the Cambrian strata. The Chicques quartzite is moreover more than 1000 feet thick along the northern border of the South Mountains in Cumberland and Fayette Co., Pa.

Scolithus minutus, Wing: quoted by Brainard & Seely in Bull. Geol. Soc. Amer. Vol. 1, 1390, page 504, who say that some of the fine-grained sandstone layers at the bottom of the Middle division (C) of the *Calciferous* formation in Vermont, weather like fine-grained wood, and are "pin-holed with worm burrows." This Division C (350′ thick) is made up of alternations of sandstone and magnesian limestone. — *IIa*.

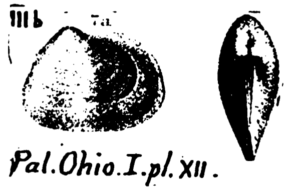
Sea-weeds. See **Taonurus marginatus**. See an interesting discussion of Lesquereux's discoveries and views in Report of Progress J, pp. 97 to 102.

Selaginites formosus, Dawson. Canad. Nat. and Geol. Vol. 6, 1861. Geol. Canada, 1863, page 399, fig. 428 *a*, a fragment of shale with portions of a large and small specimen,



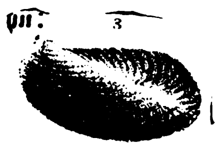
showing the imbricating (over lapping) scales; with three fragments of *Psilophyton princeps*, and two of *Cordaites angustifolia;* 428 *b*, *enlarged* small specimen; 428 *c*, *enlarged* scale of larger specimen. *Gaspe Sand.* (*Devonian*). *VIII.*

Sedgwickia ? compressa, Meek, Proc. Acad. Nat. Sci. Phila. 1872. *Cincin. group.* Pal. Ohio, Vol. 1, 1873, page 144, plate 12, fig. 7 *a*, *nat. size*, left ? side view; *b*, dorsal view. Meek only saw one specimen, and that a cast, and he was uncertain whether its shorter side might not be the behind instead of the front; yet he is quite sure that this specimen is of a species different from the distorted specimens of *S. fragilis* (p. 143.) He says that James referred it in his list to *Anatina ? sinuata*, Hall, but that it differs a little from that *Upper Silurian* species, and can hardly be the same because it is a *Lower Silurian* fossil. 300′ above river at Cincinnati, O. in *III b.*

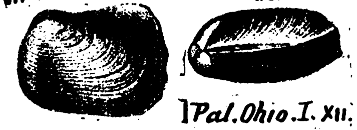


Pal.Ohio.I.pl.XII.

Sedgwickia ? divaricata, Hall and Whitf. Pal. Ohio, Vol. 2, 1875, page 89, plate 2, fig. 3, of a unique specimen, left side showing general form and surface markings; viz. two sets of ridges; one, strong concentric waves parallel to the lines of growth; the other, strong rounded folds diverging from the beak ridge towards the base of the shell downwards, and toward the hinge margin upwards; mostly simple, but a few seem to fork; an exceedingly rare feature for the surface of Lamellibranch shells, and therefore it is extraordinary that two species in the same formation and same locality should exhibit it, viz. this one, and *Modiolopsis pholadiformis;* and they are the only American forms of the age so marked, Blanchester, O. *III b.*



Sedgwickia ? fragilis, Meek, Proc. Acad. Nat. Sci. Phil. 1872. Pal. Ohio, Vol. 1, 1875, page 143, plate 12, fig. 3 *a*, *natural size*, left side; *b*, dorsal view. Imperfect specimens, doubtfully referred to this genus (perhaps more prop-



Pal.Ohio.I.XII.

erly to *Modiolopsis*) from Cincinnati, O., 350′ above river, *Hudson river beds. III b.*

Sedgwickia (*? Grammysia*) **neglecta,** Meek, Proc. Acad. Nat Sci. Phila. 1872. Pal. Ohio, Vol. 1, 1873, page 142, plate 12, fig. 8, *natural* size, external cast of the right valve, unique specimen. Cincinnati, O. *Hudson river upper beds. III b.*

Selachians. See **Shark's teeth.**

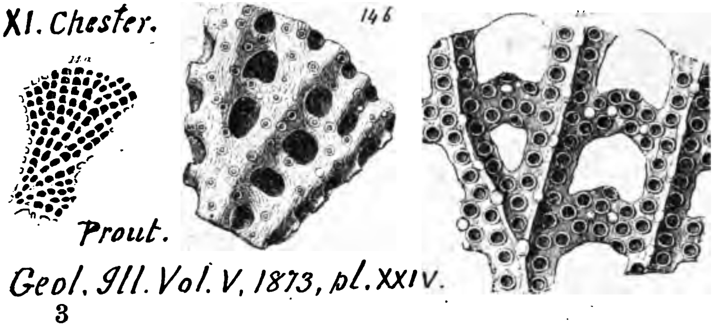
Selenichnus breviusculus, *tracks.* Hitchcock. Ich. Mass. 1858, page 134, pl. 23, f. 9, outline; pl. 60, f. 7, a row of 17 imprints. If *Macropterna vulgaris* (plate 25, fig. 9) be this *S. breviusculus*, the animal must have had fore as well as hind feet. As the specimen was found at Turner's falls with *S. falcatus* tracks, it may show the tracks of the young of that species. (Hitchcock.) *Trias.—For figures see page 948.*

Selenichnus falcatus, *tracks.* (Figure under *S. breviusculus.*) Hitch. Ich. Mass. page 133, plate 23, fig. 8, outline of foot-print; plate 60, fig. 8, *reduced,* row of 15 imprints. Turner's falls. *Trias.*

Semiopora bistigmata, Hall, Trans. Alb. Inst. 1881; State Report, 1884; Pal. N. Y. Vol. 6, page 362, plate 62, fig. 27, *natural size*, fragment of frond; 28, *enlarged six times ;* 29, cross-section. From West Canada, *Hamilton strata. VIII c.*

Hall, Pal. N.Y. Vol. VI, 1887, pl. 62.

Septopora cestriensis, Prout. Trans. St. Louis Acad. Sci.



Geol. Ill. Vol. V, 1873, pl. XXIV.

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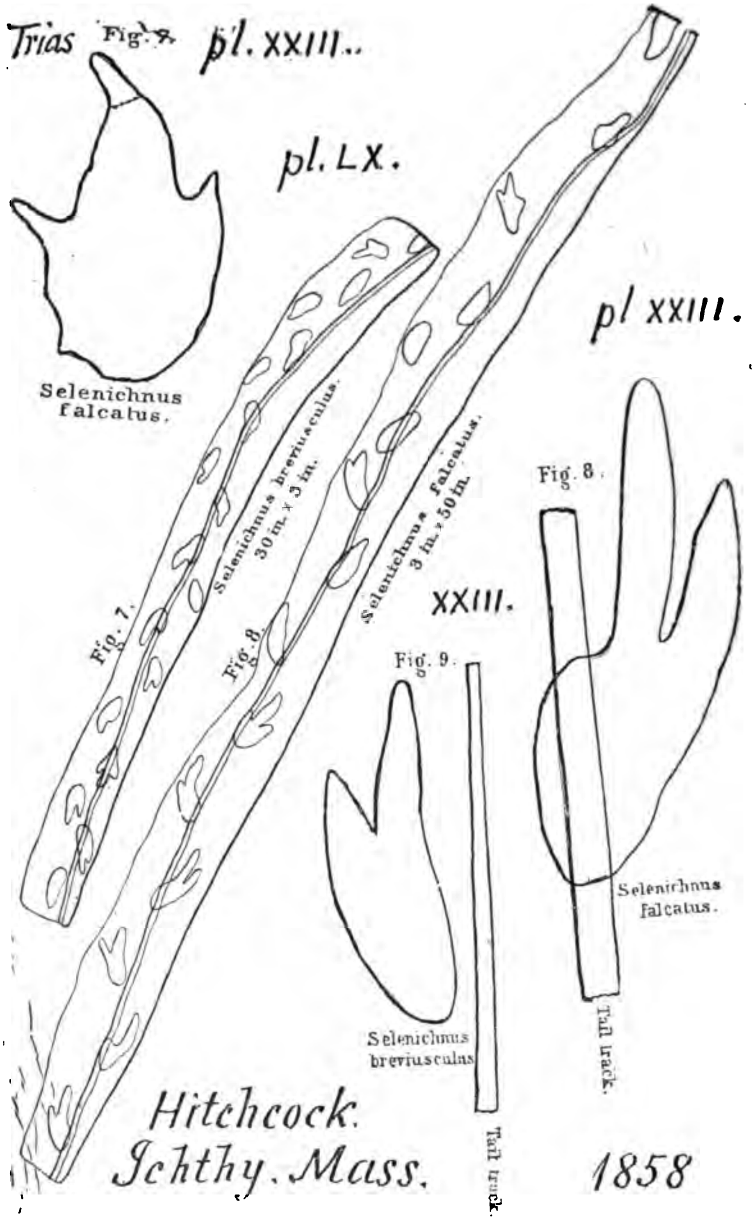
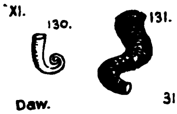


1850. — M. & W., Geol. Sur. Ill., Vol. 5, 1873, plate 24, figs. 14 *a*, *b*, *c*, *natural size*, and *magnified;* from the *Chester* (*subcaroniferous*) *limestone*, of the Mississippi Valley. *XI*.

Serpulites hortonensis, and **annulatus.** Dawson, Acadian Geology, 1868, page 312, fig. 130; and page 313, fig. 131; both from the *Carboniferous limestone* of Nova Scotia and Cape Breton. *XI.*



Sharks' teeth in *VIII, X, XI.* Report I, pp. 67, 70, 75.) See **Cladodus**, etc. The *Selachians* are sharks, rays or skates, either naked or covered with a shagreen skin. Their fossil spines are called Ichthyodorulites. They are also known as *Elasmobranch* fishes. In describing the remarkable fish-beds near Columbus, O., in the upper part of the *Corniferous limestone* (*VIII a*), Dr. Newberry (U. S. G. Sur. Monog. XVI, p. 31, 1889) remarks that "by far the most numerous of the fossils contained in the deposit are the stud-like dermal ossicles of Salachians," mostly plain, but some sculptured in radiating ridges, like a scallop shell, like Pander's *Cœlolepis* and *Nostolepis;* associated with numerous Elasmobranch teeth, generally small and of various shapes, mostly like Agassiz' *Chomatodus.* "The abundance of the remains of Elasmobranch fishes in this deposit," he adds, "is surprising, considering their general scarcity in the *Corniferous limestone*, and indeed in all the *Devonian rocks,*" but "in the Devonian seas *Elasmobranchs* were comparatively few and small, and were far surpassed in numbers and in size by the scaled and plated *Ganoids* — the ruling dynasty at that age of the world." He considers the fish-bed as a deposit of the undigested excrements of these larger fish feeding among coral reefs on the smaller sharks. Dr. Newberry's classification of the Ohio formations differ from that of New York and Pennsylvania in making the Devonian system end at the top of the *Portage shales*, *VIII f;* so that his "Lower Carboniferous" comprises the *Chemung*, *VIII g*, the *Catskill*, *IX*, and the *Pocono* (*Waverly*) *X.* In these formations sharks' teeth and spines become very numerous and large, showing a constantly growing preponderance of the Elasmobranch fishes, until they become the masters of the Carboniferous sea. — His classification is also peculiar in this, that he regards much of our upper Devonian (*Chemung* and *Catskill*) as contemporary with the western Subcarboniferous *Mauch Chunk mountain limestone. XI.* This I discuss in my Final Report.

Shepardia palmipes, *tracks*. Hitchcock, Ich. Mass. 1858, p. 131, pl. 24, f. 2, *natural size*, outline of prints of fore and hind feet, with five toes, planted close in front of each other; in the Shepard cabinet of Amherst College; there is a doubtful one in the Ichnological cabinet; foot evidently webbed; compare a similar figure in Emmon's Geology, made from a specimen in the N. Y. State Museum at Albany. Turner's falls. *Trias. — For figure, see Appendix.*

Sigillaria acuminata, Newb., 1874. *XIII.*

Sigillaria alternans, Lindley and Hutton. Lesq. Coal Flora, p. 501, 502, makes it a synonym of *S. reniformis*. It is quoted under its old name as found beneath the *Darlington bed*, Beaver Co. Pa. (Q, 55.) *XIII.*

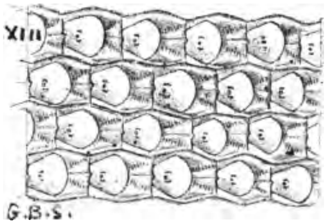
Sigillaria alveolaris, Stern., 1820. *XIII.*

Sigillaria angusta, Brongt., 1828. *XIII.*

Sigillaria approximata, Font. and White, 1880. *XVI.*

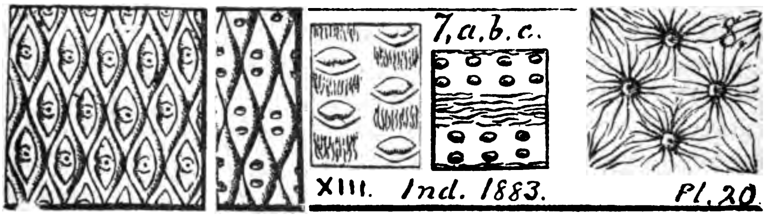
Sigillaria attenuata, Lesqx., 1858. *XIII.*

Sigillaria conjugata. G. B. Simpson's drawing (1889) of Specimen No. 1112, in Mr. Lacoe's collection at Pittston, Pa., from Rockwood? Tennessee. *Coal measures. XIII?*



1112 a of Lacoe's Collection

Sigillaria brardii, Brongniart (Hist. Veg. Foss. plate 158;

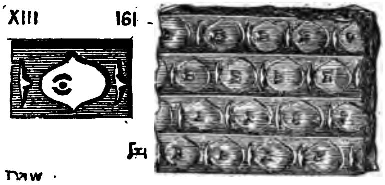


Gold.; Germ.; Weiss. pl. 16 and 17; Lesq. Geol. Pa. and Geol. of Ill. Vol. 2; Schimper; Heer; and Grand 'Eury. Coal Flora of Pa. 1880, page 477, plate 73, figs. 8 to 16.) Collett's Indiana Rt. of 1883, page 92, pl. 20, figs. 7 to 7 *c*, bark; fig. 8, piece of the root (*stigmaria.*) — Very common in the middle Coal Measures; not rare in upper anthracite strata; Pomeroy, Coshocton, O.; Colchester, Duquoin, Ill. Lesquereux specimens were from Washington Co., Pa. — NOTE. At a locality where no other *Sigillaria* was found Lesquereux studied this species in its very variable aspects. See also his interesting description of Mr. Huston's fine specimen from 50′ below Crinoidal limestone (Pittsburgh Barren Series) at Coshocton, O., with the plain evidences of annual growth, in Coal Flora, Report P, page 798. — Spec. C 5–1 (OO), seven specimens, C 5–6 (six large specimens), C 0–7 (? with leaves), C 6–8 (ditto), C 6–9 (four poor specimens), C 7–10. *XIII; XV.*

Sigillaria brardii var. **rugulosa,** Lesqx. ined. Specimen No. 733 in W. Lacoe's cabinet at Pittston, Pa. Found in Anthracite coal measure at Plymouth and Pittston. *XIII.*

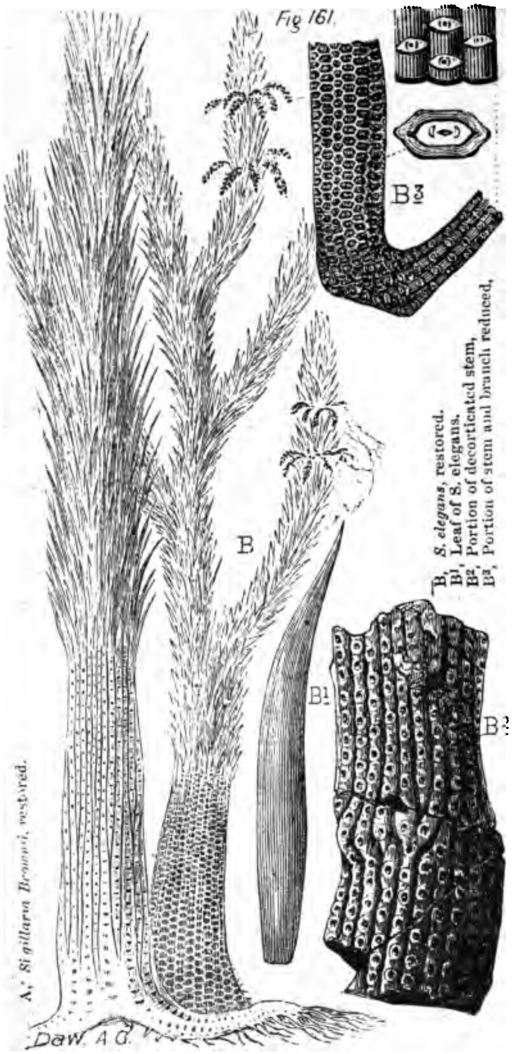
Sigillaria brochanti. Brngt. Veg. Foss. pl. 159, f. 2, identified by Lesquereux, in Lacoe's specimen No. 618, from the anthracite Butler mine, coal E, at Pittston, Luzerne Co., Pa. (Coal Flora, Additions, etc., p. 1884, page 842.)

Sigillaria bretonensis, Dawson. (*Favularia,* Sternberg.) Acadian Geology, 1868, p. 432, fig. 161, F, $\frac{2}{3}$ *size* F1, *natural size*, one of the leaf scars. *Coal measures* of Nova Scotia. *XIII.*



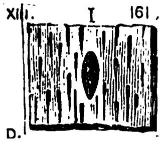
Sigillaria brongniarti. Geinitz. (*S. pes-capreoli*, Gein.; *Syringodendron pes-capreoli*, St.) Lesq. Coal Flora, p. 504, plate 70, figs. 3, 3 *a*, 3 *b*. Two specimens from the lower anthracite coal bed at Trevorton, Pa. White reports a few specimens seen in the roof shales of the *Barnet bed* (lowest) at Reed mine on Broad Top, Huntingdon Co. (T3, 313.) *XIII.*

Sigillaria brownii, Dawson. Acadian Geology, 1868, page 432, fig. 161, a restoration of the growing plant. (With this also Dawson gives his restoration of *Sigillaria elegans*, fig. 161 B; and B1, a leaf of the same; B2, a portion of its decorticated stem; B3, a portion of its stem and its branches on a *reduced scale.*) Other figs. of *S. brownii* he gives on page 180, fig. 30, Acad. Geology. *XIII.*

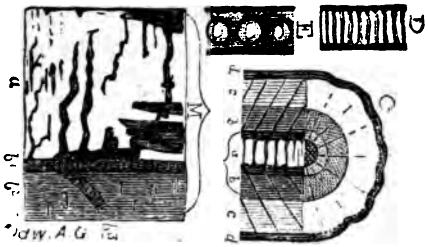


A, *Sigillaria Brownii*, restored.

B, *S. elegans*, restored.
B1, Leaf of S. elegans.
B2, Portion of decorticated stem,
B3, Portion of stem and branch reduced,



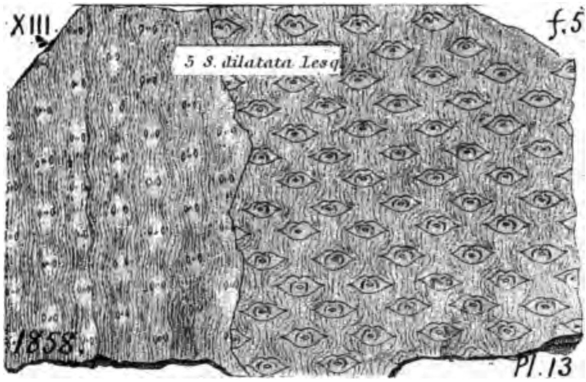
Sigillaria catenoides, Dawson. XIII. Acadian Geology, 1868, p. 432, fig. 1615, *one-half nat. size*, one of the leaf scars. *Coal measures* of Nova Scotia. *XIII.*



Sigillaria brownii, *continued.* Fig. 161 C, cross section of this species? *reduced;* and a portion of it (M) of *natural size*, to show (*a*) the *Sternbergia* pith; (*b1*) the inner cylinder of scalariform vessels; (*b2*) outer cylinder of discigerous cells, with medullary rays and bundles of scalariform vessels going to the leaves at (*b3*,); inner bark; (*d*) outer bark. D, *magnified* scalariform vessel. E, *magnified* discigerous woody stem.—*XIII.*

Sigillaria chemungensis. **Lepidodendron chemungensis.** VIII g.

Sigillaria dentata, Newberry. Ann. Sci. Cleveland, Vol. 1, p. 165, fig. 4.—Lesq. Coal Flora, p. 481, 482, makes it a synonym ot *Sigillaria tessellata*, Brongt.—*XII*, *XIII*, *XIV.*



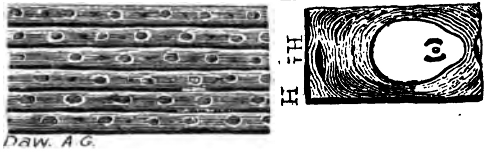
Sigillaria dilatata. Lesq. Geol. Pa. 1858, p. 871, plate 13, fig. 5; Coal Flora of Pa. 1880, page 472; distinct species easily recognized; found in Carbondale, Clarkson's collection) lower anthracite beds of northern Field; then in the Pottsfield field, near Port Carbon, and on Muddy Creek. Specimens Si, 17, 54, Mus. C. Z. Cambridge, Mass.—*XIII.*

Sigillaria discoidea. See *S. lacoei.* *XIII.*

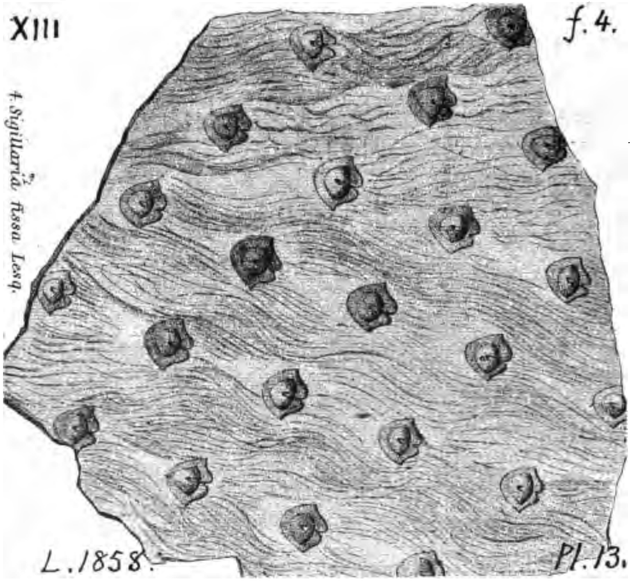
Sigillaria elegans. Dawson. Acadian Geology, 1868, page 432, fig. 161; *included in the figure under S. brownii, above.* (NOTE. *S. elegans*, Brgt. Hist. Veg. Foss. p. 438, pl. 156, figs. 2, 3; pl. 162, fig. 6, is made by Lesquereux, in Coal Flora, p. 481, a synonym of **Sigillaria tessellata**—*XIII.*

Sigillaria eliptica. Brogniart.—Lesq. Coal Flora, p. 494; allied to *D. lescurii*, as shown in plate 72, fig. 8. Abundant at Cuyahoga Falls, O. Also one specimen found by Mr. Mansfield in his mine at Cannelton, Beaver Co., Pa. Other specimens in Lacoe's cabinet from the Anthracite F *vein* at Plymouth, Luzerne Co., Pa.—*XIII*.

Sigillaria eminens, Dawson. Acadian Geology, 1868, page 432, fig. 161, H, *reduced;* H1, *half size*, areole; in Nova Scotia *coal measures. XIII.*


H, *S. eminens*, reduced. (H¹) areole, half n. size.

Sigillaria fissa. Lesq. Geol. Pa. 1858, p. 871, plate [13, fig. 4, Coal Flora, 1880 p. 470, pl. 73, f. 17. A beautiful species found on Muddy creek, west of Pottsville. Also Muddy creek, near Shamokin where I found plants of peculiar types not seen elsewhere; *Sigillaria schimperi* among others." Lesq. in Coal Flora. [" Shamokin " is here probably written for "Trevorton."] *Sig. denudata*, Goep. is closely allied.—*XIII.*

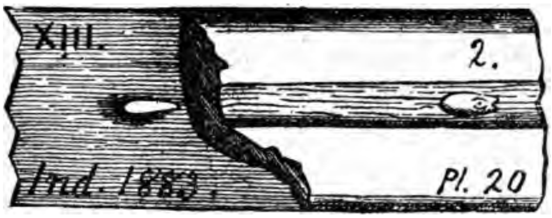


S. flexuosa, L. & H. 1837. Coal Fl. Lesq.

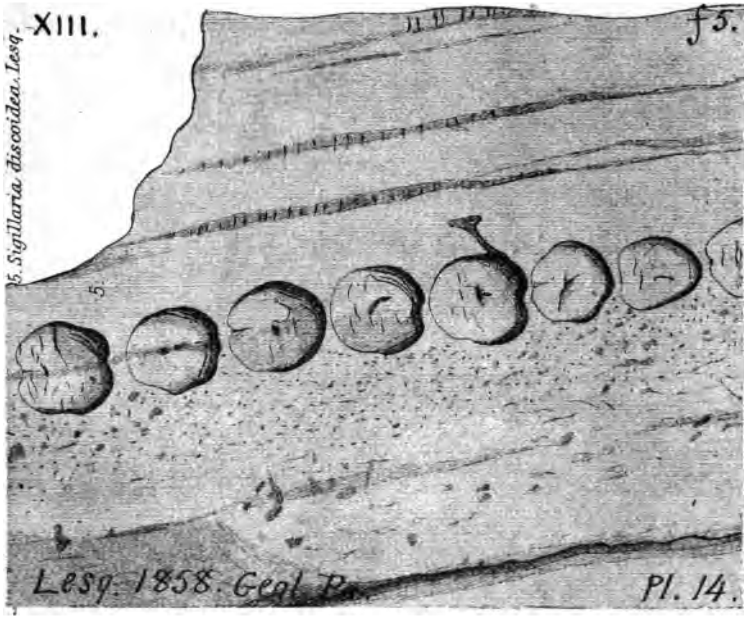
S. grandeuryi, Lesq. 1884.

S. hexagona, Schlot. 1820. Coal Fl. Lesq.

Sigillaria lacoei. *Sigillaria discoidea*, Lesquereux, Geol.



Pa. 1858, plate 14, f. 5. Coal Flora of Pa., 1880, page 449, plate 72, figs. 12 to 12*b*, from Mr. Lacoe's cabinet at Pittston, Pa. Collett's Indiana Rt. 1883, page 94, plate 20, fig. 2.—*Anthracite beds* at Pittston; many specimens, from Vein F.


XIII.
5. Sigillaria discoidea. Lesq.
f5.
5
Lesq. 1858. Geol. Pa.
Pl. 14.

Also from Summit mine. *XIII.*

S. lacoei var. **minor,** Lesqx. ined. Specimen No. 734 from Plymouth Pa., in the cabinet of Mr. Lacoe *XIII.*

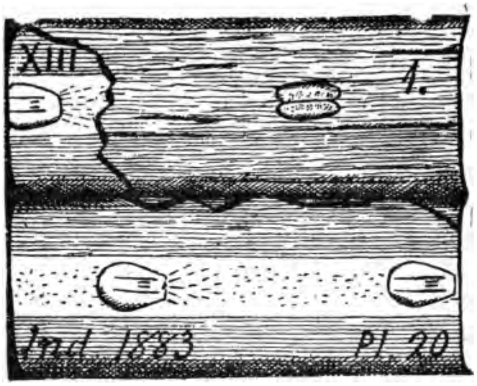
Sigillaria laurenciana, Lesqx. ined. Specimen No. 1081 of Lacoe's Cabinet at Pittston, Pa., from Lawrence, Kansas.

Sigillaria laveretti, Lesqx. Coal Flora Penn. 1884, page 800, pl. 108, figs. 4, 5, "a beautiful species, without analogy to any other described," good specimens of which, from Des Moines Co., Iowa, are now in Mr. Lacoe's collection at Pittston, Luzerne Co., Pa. By comparison with these Mr. Lacoe has recently identified a specimen (labelled No. 480), collected for the Survey by Mr. Koch from the *Tipton coal beds* in Blair Co., Pa., which I assign to the *Pocono sandstone form.*, *No. X.*

Sigillaria mammillaris, Brongniart. — Lesq. Coal Flora, pp. 483,* 799,* plate 72, figs. 5, 6, and plate 108, fig. 6. Fig. 5 is especially curious from the fact that cross zones of deformed scars recur on it at intervals as regular as joints in Calamites, and are thought by Schimper to show where the fruit was. Two specimens at Cambridge, Mass. from the *Sub conglomerate* (Ætna vein, Tenn. and Tom's creek, S. Virginia.) Mr. Lacoe's came from No. 1 *vein* anthracite colliery at Oliphant, Luzerne Co., Pa. It is also quoted from under the *Darlington coal* at Cannelton, Beaver Co., Pa. (Q, p. 55.) — *X, XII, XIII.*

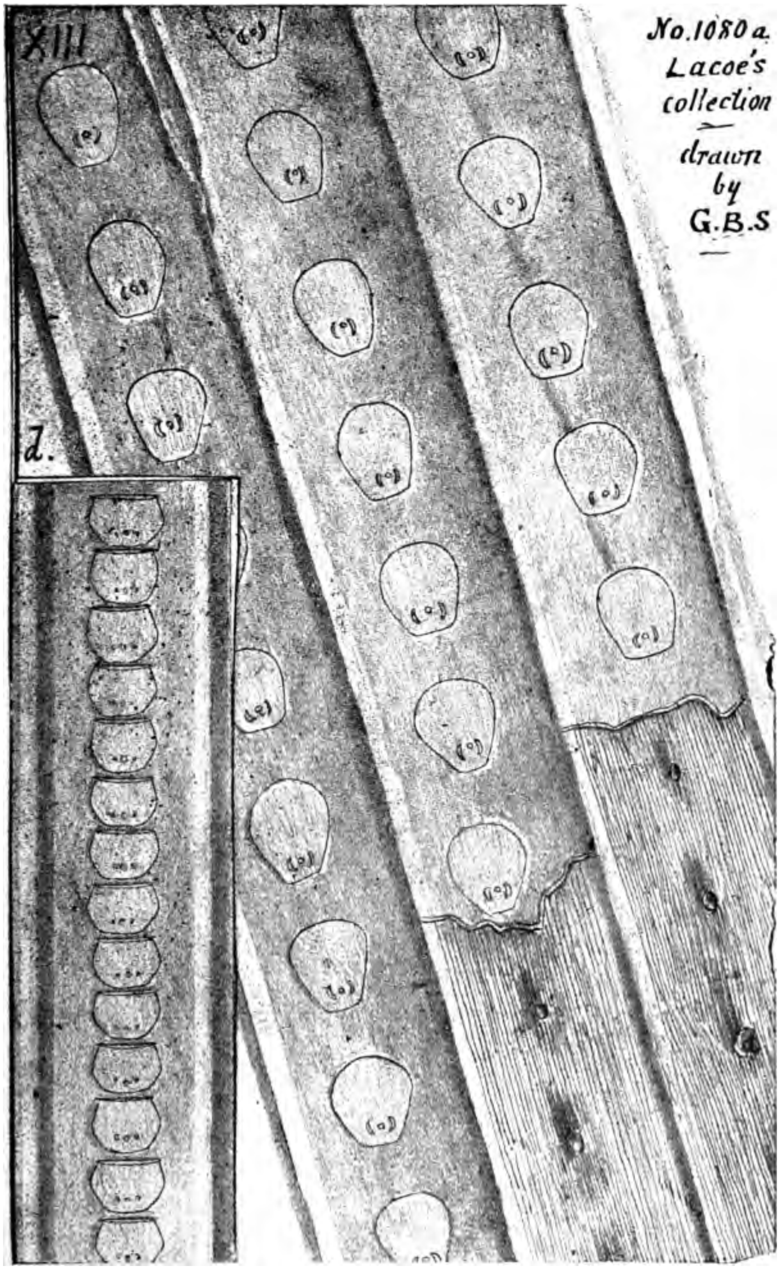
Sigillaria mamillaris, *var* **latior,** Lesq. G. B. Simpson's drawings (1889) of specimens Nos. 1080, *a*, *b*, *c*, in Mr. Lacoe's collection at Pittston, Pa., from anthracite mine workings at Pittston and at Plymouth, Luzerne Co., Pa. *XIII.* *For figures see pages 957 and 958.*

Sigillaria marginata. (Lesquereux, Coal Flora of Pa., page 498, plate 71, fig. 5, from anthracite bed F, at Plymouth colliery, Luzerne Co., Pa.) Collett's Indiana Report of 1883, page 93, plate 20, fig. 1.—*Coal measures.* — *XIII, XIV.*

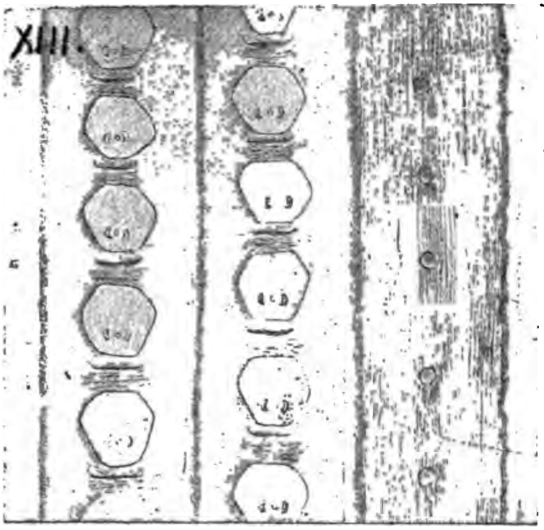


Sigillaria menardi. Brgt. Hist. Veg. Foss. plate 158, figs. 5, 6. — Lesquereux, Geol. Pa., 1858, p. 871. Coal Flora, 1880, 479. Lesquereux is disposed to think that Schimper is right in supposing that it might be the same as *S. brardii*, Brgt. He says that Brongniart's type specimens were sent to him by Cist from

S. mammillaris, var. *latior*. *See page 956.*

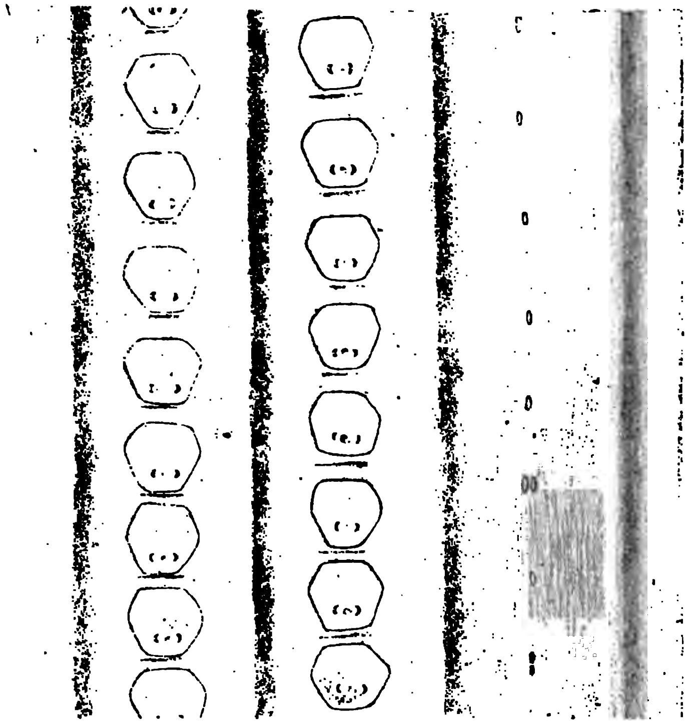


Sigillaria mammillaris, var. latior, continued.



No. 1080
b
of
Mr. Lacoe
at
Pittston.
Drawn by
G.B. Simpson

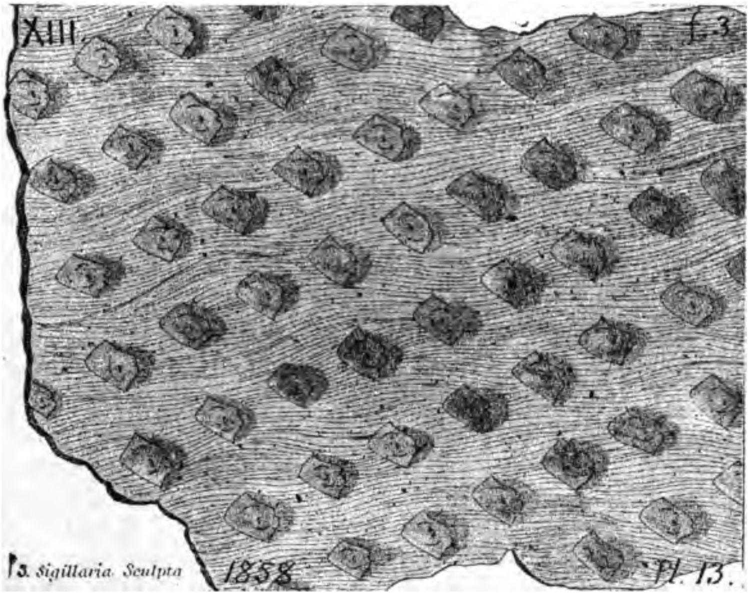
No. 1080
c



Wilkesbarre, where various forms of *S. brardii* are commonly found, and that very good specimens of the latter often want the lateral vascular scars, and then cannot be distinguished from *S. menardi.* — In S. W. Penn. Stevenson reports great abundance of its *leaves* crowding the *fish bed* (with scales and crustaceans) which overlies the *White upper Washington limestone*, *No. VI* of the *Upper Barren measures*, on W. fork of Pursley creek, no other part of the plant being there seen (K, 47, 152; K3, 305); also *stems* abundant in the same at the tunnel east of Washington. (K, 242; K3, 305.) *XIII; XVI.*

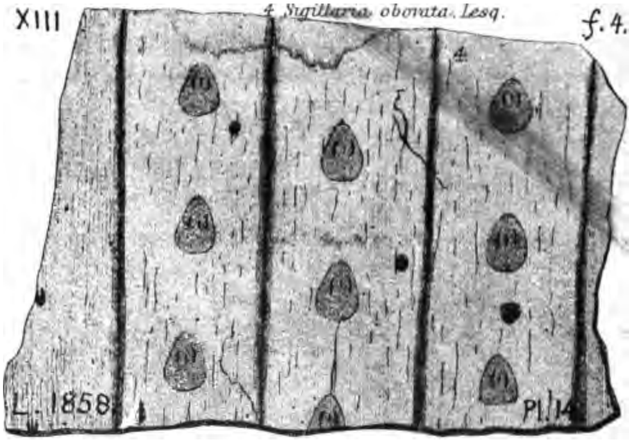
Sigillaria monostigma, Lesq. Coal Flora, p. 468*, plate 73, figs. 3 to 6. (*Asolanus camptotœnia*, Wood, Proc. Amer. Philos. Soc. Phila., p. 238, plate 4, fig. 1.) This species until now represents a type peculiar to the American coal flora. (Lesq. 1880.) Not rare at Colchester, Ill. Abounds in the shale under the *Kittanning coal* (Darlington cannel bed) at Cannelton, Beaver Co., Pa., where Mansfield has obtained many splendid specimens representing the characters of the species in a multiplicity of forms. (Lesq.) Specimens in Lacoe's cabinet at Pittston, Pa., from the anthracite *coal B. XIII.*

Sigillaria obliqua (*Sigillaria sculpta.*) Lesq. Geol. Pa.

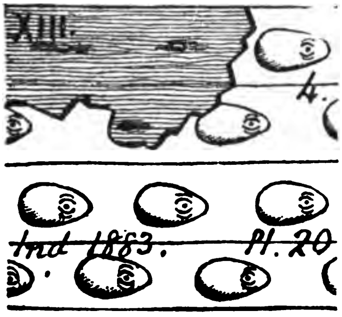


p. 871, pl. 13, f. 3; a fine species, somewhat like *S. lepidodendrifolia*, Bgt., but with *raised* scars, bordered above and pointed below; from the Gate vein at New Philadelphia, anthracite Coal Flora, 1880, p. 470, pl. 73, fig. 18. *Sigillaria rhomboidea*, Bgt. Not rare; but variable. A large slate from Plymouth anthracite colliery is in Lacoe's cabinet at Pittston, Pa. It occurs in the Duguoin coal, Illinois, as *S. rhomboidea.* Many specimens from Oliphant anthracite beds are in Lacoe's cabinet. (Lesq.) It is also quoted by White as in Lesquereux's list of plants from the black shale under the Darlington cannel coal at Cannelton, Beaver Co., Pa. (Q, p. 55.) *XIII.*

Sigillaria obovata. Lesq. Geol. Pa. 1858, p. 872'3, pl. 14, fig. 4. Coal Flora Pa., 1880, p. 496; from lower anthracite beds at Trevorton, west of Pottsville, in company with *Sigillaria cortei* of Brt. Its scars are simple oval mammillæ as in *S. ovalis. XIII.*

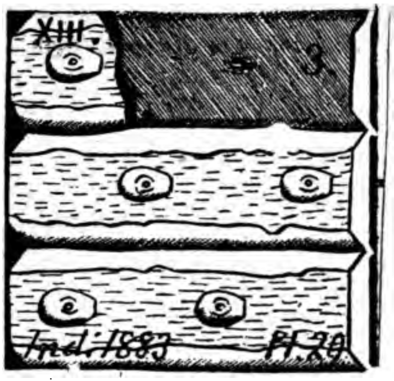


Sigillaria ovalis. (Lesquereux, Coal Flora, page 495, plate 71, figs. 7, 8, from W. Lacoe's cabinet at Pittston, Luzerne Co., Pa.) Collett's Indiana Report of 1883, plate 20, fig. 1. The bark is nearly one millemeter thick; scars one centemeter apart, i. e. about their own length. Fig. 8 shows a remarkable fold of the bark in thin layers laid upon each other. Lesq. *XIII.*

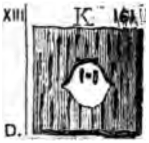


Sigillaria pes-capreoli. See **S. brogniarti.** *XIII.*

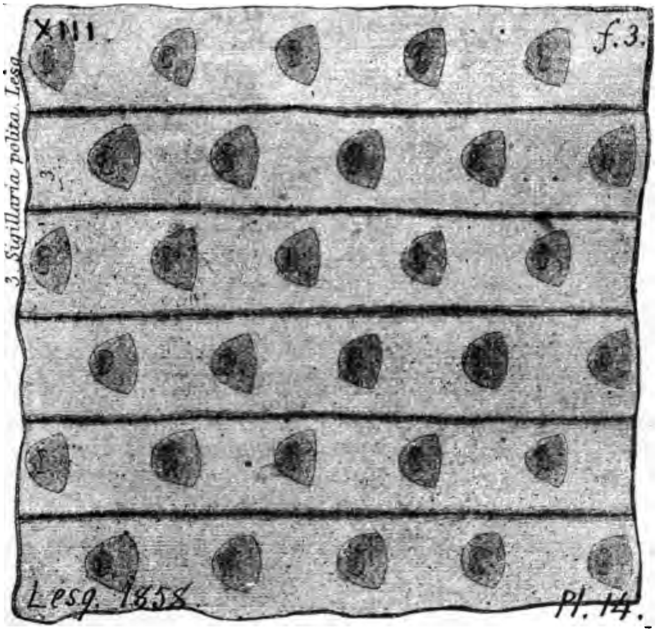
Sigillaria pittstoniana. (Lesquereux Coal Flora of Pa., Report P, 1880, page 493, plate 71, fig. 4; one of numerous specimens from the Plymouth anthracite bed F, Luzerne Co., Pa.; allied to *Sigillaria rugosa* of Brongt., plate 144.) Collett's Indiana Rt. of 1883, plate 20, fig. 3. *Middle Coal Measures. XIV.*



Sigillaria planicosta, Dawson Acadian Geology, 1868, p. 432, fig. 161 K. ½ *nat. size,* one of the leaf scars. *Coal measures* of Nova Scotia. *XIII.*



Sigillaria polita. Lesq. Geol. Pa. 1858, p. 874, pl. 14, fig. 3; Coal Flora, 1880, 490, pl. 73, f. 1. A fine species seen in the low anthracite beds at Carbondale; with affinity to *Sigillária saullii.* Bgt. and *Sig. hyppocrepis,*



Brongrt. Closely related to *Sig. yardlei*, Lesq. (C. Fl, pl. 73 f. 3; catalogue of Pottsville Scientific Association, p 17, plate 2, fig. 4, good specimens of which Lesq. found at *Mammoth Bed*, Raush Gap, Pa.) *XIII.*

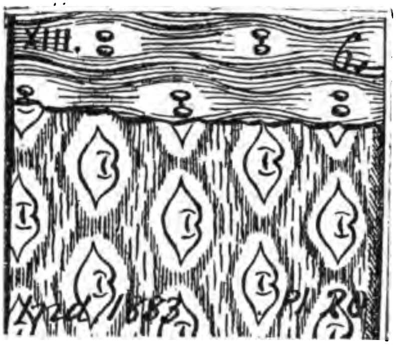
Sigillaria pulchra, Newb. 1874. *XIII.*

Sigillaria pyriformis, Brongt. 1828.—Lesqx. Coal Flora, page 799. *XIII.*

Sigillaria rectostriata, Lesqx. ined. Specimen No. 1112 of Lacoe's cabinet at Pittston, Pa.

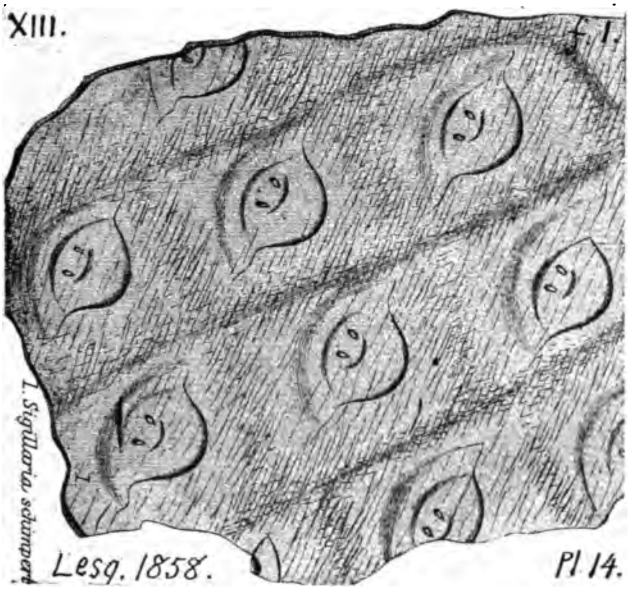
Sigillaria reniformis, Brongniart. (*S. monostachya*, L. & Hutt.; *S. alternans*, L. & H.) — Lesq. Coal Flora, page 501*, plate 70, figs. 5 to 9. Specimens with the bark preserved are still rarer than those of *S. lævigata*. Bgt., and the many without bark are referred to either species at hazard (Lesq.). Extremely common at some localities, especially in the anthracite basin of Wilkesbarre, at Pittston, Pottsville, New Philadelphia, etc., but rare in the western bituminous coal fields (Lesq.). Found under the *Darlington bed* at Cannelton, Beaver Co., Pa. (Q, 55); and quoted as spec. C5–2 (OOO, p. 255), from White's collections, at the tunnel one mile east of Washington, from the roof shales of the *Washington limestone*. *XIII; XV.*

Sigillaria reticulata. (Lesquereux, Geological Report of Arkansas, Vol. 2, page 310, plate 3, fig. 2; Coal Flora of Pa. 1880, page 473, plate 73, figs. 19, 19 *a*, from Male's coal bank, Ark., also from coal beds in Alabama.) Collett's Ind. Rt. 1882, plate 20, fig. 6. *Sub-conglomerate Coal Measures. XI.*

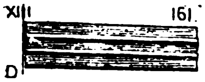


Sigillaria rugosa, near **S. pittstoniana.** *XIII.*

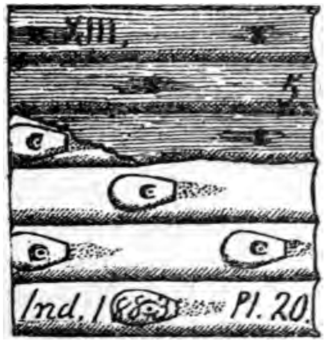
Sigillaria saullii, Brgt. Veg. Foss. Plate 151, identified by Lesquereux, in Lacoe's specimen No. 471, from an anthracite bed at Plymouth, Luzerne Co., Pa. (Coal Flora, Additions, etc., 1884, P, page 842.) *XIII.*



Sigillaria schimperi. Lesq. Geol. Pa. 1850, 871, pl. 14, fig. 1; a remarkable and beautiful species from Muddy creek old anthracite bed, west of Pottsville. Coal Flora, 1880, p. 174, pl. 73, fig. 21; surface rougher than shown in the plate, and crossed by narrow disconnected lines, which traverse even the leaf scars; specimen in Cambridge, Mass., marked S 1. *XIII.*

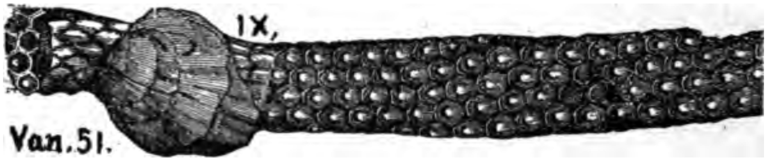


Sigillaria scutellata, Brongt. (*Rhytidolepis* Sternberg.) Dawson's Acadian Geology, 1868, p. 432, fig. 161 L. portion of leaf. *Coal Measures* of Nova Scotia. *XIII.*



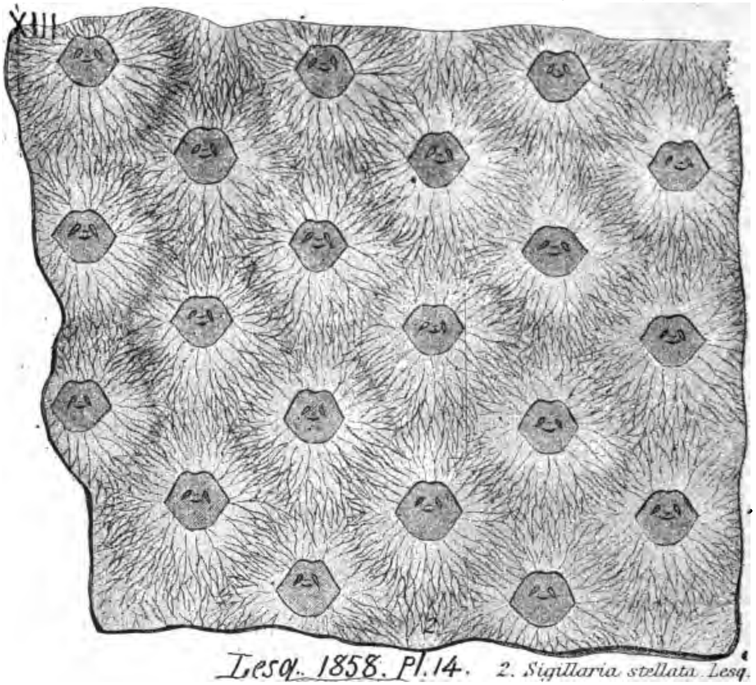
Sigillaria sillimani (Brongniart, Hist. Veg. Foss. plate 147; Goldfuss, plate 9; Lesquereux, Geol. Pa. 1858, page 872; Coal Flora of Pa. 1880, page 493, plate 71, fig. 6; especially numerous in the shales of anthracite bed F, at Plymouth, opposite Wilkesbarre, whence Brongniart's specimen came.) Collett's Ind. Rt. 1883, plate 20, fig. 5. *Coal Measures, XIII.*

Sigillaria simplicitas. Vanuxem, Geology of the Third district, N. Y., 1842, page 190, fig. 54. *Catskill formation. IX.* (Lesquereux says it came from the *Hamilton beds* of western New York; is undeterminable; and puts it, but not as a synonym, under *S. vanuxemi*, Goepp. (C. Flora, p. 506.) *VIII c (?)*.



Sigillaria spinulosa, Germ. 1844. Verstein. von Wettin, page 58. *Coal Measures* (S. A. M.)

Sigillaria stellata. Lesq. Geol. Pa. 871, XIV, 2; Coal Flora, 474, pl. 73, fig. 20; large specimens of this beautiful tree are in the Clarkson cabinet at Carbondale, from low anthracite beds; one from the same locality is in the Museum at Cambridge, Mass. Allied to *S. reticulata*, it differs widely in the shape of scar and direction of striæ. *XIII.*

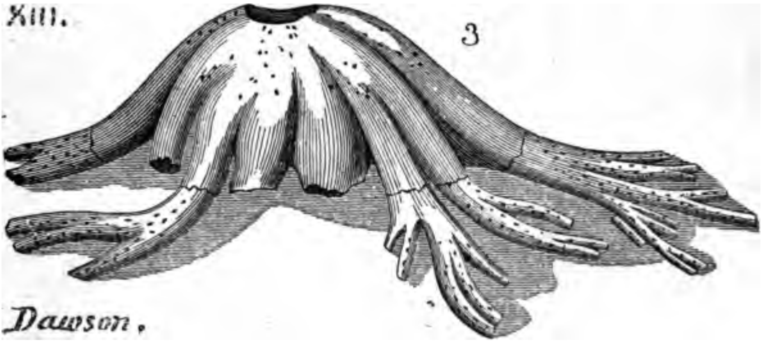

XIII
2
Lesq. 1858. Pl. 14.
2. Sigillaria stellata Lesq.

Sigillaria striata, Dawson. Acadian Geology, 1868, page 432, fig. 161 G, *natural size. Coal measure* of Nova Scotia. *XIII.*

Daw. A. G.

Sigillaria suborbicularis, Lesqx. ined. Specimen No, 1108 of Mr. Lacoe's cabinet at Pittston, Pa., from *Anthracite coal measures* at Wilkesbarre, Pa. *XIII.*

Sigillaria sydensis, Dawson. Acad. Geol. 1868, p. 406, XIII.



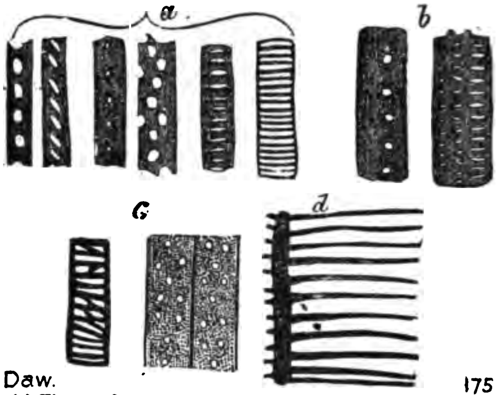
Dawson, plate fig. 3 (½ *nat. size*), a stump with its roots exposed by W. Brown in the Sydney coal mines, and described by him in the Journal of the Geol. Soc. Vol. 5, page 355; these roots (*Stigmaria*) were spread through a bed of shale, over the coal bed; and over this shale a bed of black shale abounding in leaves, etc. Four large tap roots in each quarter of the stump (16 in all); with two vertical smaller tap roots to each (48 in all); 32 double rows of leaf scars on the circumference of the trunk.

Sigillaria tessellata, Brongt. Hist. Veg. Foss. 1828. (*Phytolithus tesselatus*, Steinhauer, Trans. Amer. Philos. Soc. Phila. Vol. 1, 1818, p. 295, plate 7, fig. 2. — *Sig. microstigma*, Brgt. — *Sig. elegans*, Brgt. — *Sig. knorrii*, Brgt. — *Sig. alveolaris*, Brgt. — *Lepidodendron alveolare*, St. — *Sig. minima*, and *ornata*, Brgt. *Sig. dentata*, Newberry. — *Favularia tessellata*, Ll. and Hutt.— *Fav. elegans*, *Fav. variolata ; Aspidiaria variolata*, St. — *Palmacites variolatus*, Schloth., etc.) Lesq. Coal Flora, p. 481, plate 72, figs. 2 to 4. A species so variable that the leaf scars of any specimen referable to it have rarely the same shape. Lesq. gives Schimper's synonomy as above. Generally found in the whole thickness of the middle coal measures, especially anthracite, at Pittston, etc. Also under the Darlington coal at Cannelton. At Murpheysboro', Ill. Rare in the west. White reports finding numerous specimens in a black shale between a coal and its fire clay which separates the *Connoquenessing SS.* (*Middle Pottsville conglomerate.*) (Q, 70.) *XII; XIII.*

Sigillaria tissue. Dawson, Acadian Geology, 1868, p. 464, fig. 175 *a*, the tissue of the axis of the plant, seen under the microscope after the method of preparation devised by Sir J. W. Dawson and described by him on page 463. Fig. *a Sigillaria; b*, tissues of *Calamites? c*, of Ferns; *d*, scalariform vessel of *Lepidodendron.*

XIII.

Fig. 175.—*Tissues from Coal.*



(*a*) Tissues of axis of Sigillaria. (*b*) Tissues of Calamites? (*c*) Tissues of Ferns. (*d*) Scalariform vessel of Lepidodendron.

Sigillaria venosa, Brgt. Veg. Foss. pl. 157, f. 6, identified in specimen No. 900 of Lacoe's collection, from anthracite bed F, at Plymouth. (Coal Flora, page 842.) — *XIII.*

Sigillaria weissii. Lesqx. ined. Specimen No. 1014 of Lacoe's Cabinet at Pittston, Pa., from *Conglomerate coal* of Washington Co., Arkansas. *XII.*

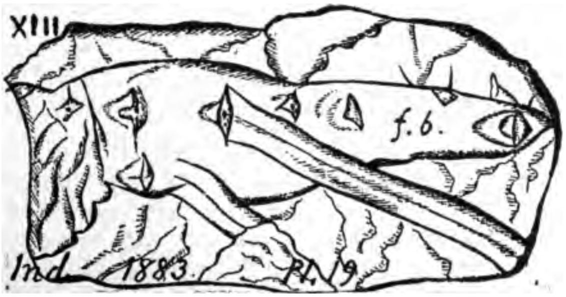
Sigillaria yardleyi. See **S. polita**. *XIII.*

Sigillaria —— ? Four specimens, collected by Koch at Tipton, in Lacoe's list of May 12, 1890.—*X.*

Sigillaria stems, with and without their bark, are enormously abundant in all the coal measures of the world, mostly in the form of casts of fragments of every size, from the smallest chip to trees of great size, and in some places so crossed and flattened upon each other as to suggest the overthrow of a swamp forest by a tornado.—The genus begins to appear in the Devonian formations. It becomes more pronounced in the lowest Carboniferous, *Pocono formation*, as at Meadville in

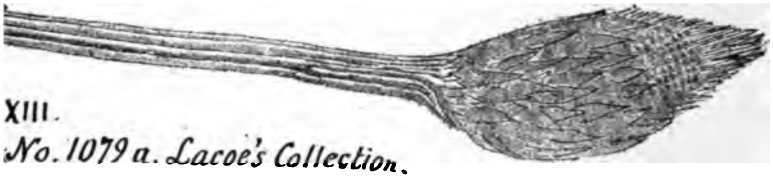
Crawford Co. (III, 37), and around Pleasantville in Venango county (specimens 2795, 3033). In the *Pottsville conglomerate* they are very common; as the great tree trunks in the lowest member (*Olean conglomerate*) over the red shale at Coalmont, Broad Top, Huntingdon Co. (T3, 302); — Spec. 2549, 2550 from Rocky ridge, E. Broad Top, near Wray's Hill tunnel; and in Wyoming Co., the sandstone floor of the Forkston coal (G7, 43); also, Specs. 3164, 3195, 3207, in Warren, Crawford and Venango Cos. — In the middle member (*Conoquenessing sandstone*) in East Broad top (T3, 71); over the Mt. Savage coal, in Southern Bedford Co. (T2, 100); over the Sharon coal in Mercer Co. (Q3, 53, 123, 126); spec. 3063, half a mile south of Allegheny Junction, Westmoreland Co.; over the *Second Mountain sand* in Venango Co. (Specs. 3096, 3132, 3133, 3135, 3147, 3154). — In the upper division (*Homewood sandstone*) on Broad Top in Bedford Co. (T2, 66). — In the *Lower Productive* (*Allegheny*) *coal measures;* as waterworn casts in the *Freeport upper sandstone* on Little Beaver river (Q2,132); and in the roof shales of the *Barnet bed*, Barnet mine, Huntingdon Co. (T3, 315.) But these are only scattered notices of what is too common in all the coarser shales and sandstone beds of the entire coal formation. Even in the *Upper Barren measures* they abound at various places, and in various horizons; as, for example in the bony partings between the benches of the *Washington coal* (K2, 365); and in the roof shales of the *Washington upper No. VI limestone*, Specs. C, 5-3,-4,-7,-8*a*, 10, (a finer form than *S. brardii*); and, from White's collections at Oak Forest, Greene Co., Specs. C 6-3 (two of leaves,) -4 (narrow leaves),-5. In the anthracite region they are equally abundant, and often very fine.

Sigillarioides, "fragments of roots bearing leaves like stigmaria attached to rhomboidal scars like stigmaria." Lesquereux Coal Flora, page 517, where he only gives the one species, *S. radicans*, Geol. Rt.



Ill. IV, plate 31, f. 4, from a Mazon creek nodule.) Collett's Ind. Rt. 1883, plate 19, fig. 6.—*Coal Measures. XIII.*

Sigillariostrobus (*unnamed*). G. B. Simpson's drawing (1889), of specimen No. 1079*a*, in Mr. Lacoe's collection at Pittston, Pa., from the Cannel coal bed at Cannelton, Beaver Co., Pa. *Kittanning group. XIII.*



XIII.
No. 1079 a. Lacoe's Collection.

Skulls of prehistoric mound builders. Three skulls were obtained in 1889, from the Floyd mound in Iowa, all of them of a type even lower in mental development than the celebrated skull found in the *Neanderthal cave* in Belgium by Dr. Schmerling. Two skulls have been found in the *glacial gravel* at Trenton, N. J., which have not yet been published.

P. Pl. Skull.
Mound builders.
Floyd mound, Ia.
C. L. Webster, in
Am. Nat. July, 1889.

Smilodon. Sabre-toothed tiger of preglacial age. See skull, and also a restoration of the whole animal, by Dr. Schufeldt in his "Remarks upon extinct mammals," in the "American Field," Vol. XXXII, Chicago, 1889.

Soleniscus acutus, Sowerby, reported found in America, but probably not. (Keyes.)

Soleniscus altonensis, *Macrocheilus altonense*, Worthen,) Keyes, Am. Nat. Vol. 23, 1889, page 423.) *Lower Coal Measures, XIII.*

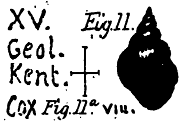
Soleniscus (??) **anguliferus** (*Macrocheilus anguliferum*, White, 1874.) *Coal Measures.* (Keyes.)

Soleniscus attenuatus. See *S. fusiformis* below.

Soleniscus brevis. See *Maerocheilus ventricosum*, Hall, figured on page 374 above. (*S. ventricosus*, White, 1884; *S. brevis*, Keyes, Am. Nat. XXIII, 1889, p. 423. Proc. Ac. N. S. Phil. 1889, part 3, page 307; evidently the young of other shells have been often mistaken for this.) *Coal Measures. XIII, XIV.*

Soleniscus carinatus, (*Loxonema carinatum*, Stevens, 1858; *Maerocheilus carinatum*, Miller, 1877,) Keyes, Am. Nat. XXIII, 1889, p. 423; Proc. A. N. S. Phil. 1889, p. 307. *Lower Coal Measures. XIII.*

Soleniscus? fusiformis. See figure under *Maerocheilus fusiforme*, Hall, on page 370 above. (*Loxonema nitidulum?* M. & W., 1860, *Polyphemopsis nitidula??* M. & W. 1866; *Macrocheilus attenuatum*, Hall, 1877; *Polyphemopsis fusiformis*, White, 1880; *S. fusiformis*, White, 1884; **S? attenuatus,** Keyes, 1889. Proc. A. N. S. Phil. 1890, part 3, p. 307.) *Lower Coal Measures. XIII.*



Soleniscus (*Macrocheilus*) **gracilis,** Cox. Geological Survey of Kentucky, Vol. 3, 1857, page 570, plate 8, fig. 11, *enlarged;* 11 *a*, *nat. size;* common in shale over Coal No. 11, Davies Co., Ky.; horizon of Waynesburg coal in S. W. Pa. *XV.* NOTE.—Keyes names it *Soleniscus*, in Amer. Nat. XXIII, 1889, p. 423.

Soleniscus hallanus (*Maerocheilus hallanum*, Geinitz, 1866, Nebraska.) *U. C. M. XV.*

Soleniscus ? hebe, Keyes. See *Macrocheilus hebe*, Hall, figured on page 371 above. *VIII c.*

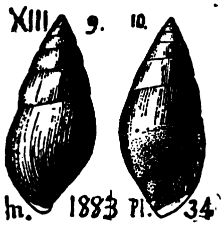
Soleniscus humilis, Keyes. (*Macrocheilus humilis*, Keyes, 1888,) Am. Nat. 1889. *L. C. M. XIII.*

Soleniscus kansasensis, (*Mach. kansasense*, Swallow,) Keyes, Am. Nat. 1889. *U. C. M. XV.*

Soleniscus klipparti (*Macrocheilus Klipparti*, Meek, 1872; *Macrocheilina klipparti*, Newberry, Pal. Ohio, Vol. 2, 1875, page 346, plate 20, fig. 6 *a*, *b*, *c*. Base of *Coal measures XII.*) Keyes, Amer. Nat. XXIII, 1889, p. 423; Proc A. N. S. Phil. 1889.

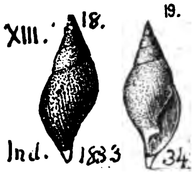
Soleniscus newberryi (*Loxonema newberryi*, Stevens, 1858; *Maerocheilus newberryi*, Hall.) *See reference and figures on page 372* of this Dictionary above. Also Keyes, Proc. A. N. S. Phil. 1888; *Soleniscus planus*, White, 1881; *S. newberryi*, White, 1884. Indiana. *C. M.*

Soleniscus paludinæformis (*Macrocheilus paludinæformis*, Hall; *See figure on page 372 above.* — *S. paludinæformis*, White, Ind. 1884. *Lower Coal Measures. XIII.*



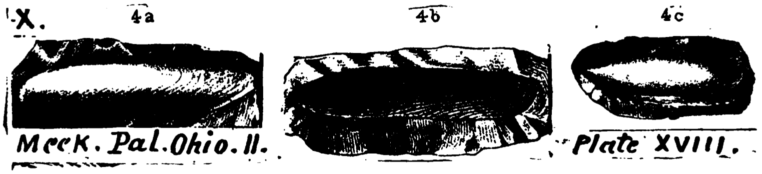
Soleniscus planus (White. Explorations west of the 100th Meridian, Sup. to Vol. 3, plate 4, fig. 1.) Collett's Indiana Report of 1883, page 153, plate 34, figs. 8, 9, *natural size*, opposite sides of an Illinois specimen; perhaps identical with *Soleniscus newberryi* (*Maerocheilus newberryi* of Hall), and also *Soleniscus fusiformis*. Roof of coals M. & N.; also *Upper Coal Measures. XIII, XV.*

Soleniscus texanus. See **Sphærodoma texana.** *See figures* under **Macrocheilus texanus**, *on page 374 above. XV.*

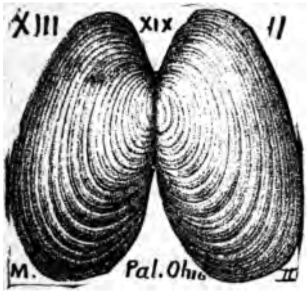


Soleniscus typicus. Meek & Worthen, Illinois Report, 1860, Vol. 2, plate figs. 3, 11 *a* 15 *b*. Collett's Indiana Report of 1883, page 152, plate 34, figs. 18, 19, copies of Meek & Worthen's original figures. Rare and only in *Upper Coal Measures* near Springfield, Ill. *XV.*

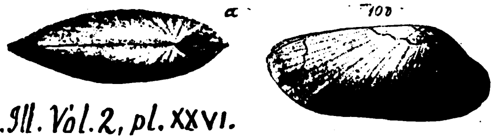
Solenocaris (*Ceratiocaris*) **strigata**, Meek, Proc. Acad. Nat. Sci. Phila., 1872, *Lower Carboniferous*. Pal. Ohio, Vol. 2, 1875, page 321, plate 18, fig. 4 *a*, a cast, apparently from interior of left valve; *b*, part of mold of same, showing striæ lengthwise; *c*, cast of opposite valve of smaller individual. Danville, Ky., base of the *Waverly* (*Pocono*) *formation. X.*



Solenomya ? anodontoides, Meek, Pal. Ohio, Vol. 2, 1875, page 339, plate 19, fig. 11. — In Pennsylvania, doubtfully identified by Heilprin among the Wyoming Valley anthracite fossils at Wilkesbarre. Geol. Sur. Pa. An. Rt. 1885, p. 451. *XIII.*

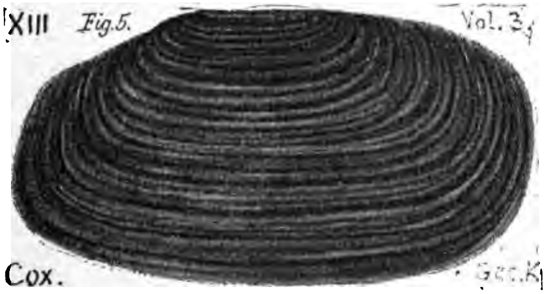


Solenomya radiata (*Solemya radiata*, Meek and Worthen, Proc. Acad. Nat. Sci. Phila., 1860.) M. & W., Geo. Sur. Ill., Vol. 2, 1866, page 349, plate 26, figs. 10 *a*, *b*, dorsal and side views of partly exfoliated specimen, from the *Coal measures* of Schuyler Co., Ill. Some specimens show the radiating plications almost as plainly on the cast of the inside as on the outside of the shell. (Meek.) — In Beaver Co., Pa., in *Ferriferous limestone* (Q, 62), and Lawrence Co. (Q2, 47). *XIII.* — Also in *Crinoidal limestone*, Fayette Co. (L, 35) *XIV.* — Also, there is a *Solenomya* abundant in the roof blue shales of the *Sewickley coal* on the Fayette Co. State line (K3, 307.) *XV.*

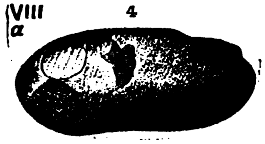


Geol. Ill. Vol. 2, pl. XXVI.

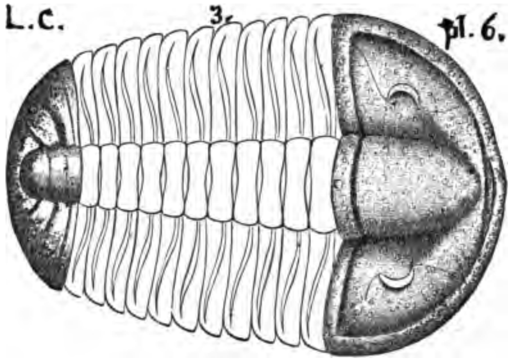
Solenomya soleniformis, Cox, Geol. Sur. Ky., Vol. 3, 1857, page 573, plate, fig. 5.



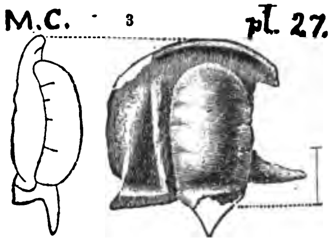
Solenomya varsoviensis, Worthen, Bull. No. 2, Ill. St. Mus. 1884; Geol. Sur. Ill. Vol. 8, page 134. *Keokuk limestone.* *XI.* (S. A. M.)



Solenomya (*Janeia*) **vetusta,** Meek, Proc. Acad. Nat. Sc. Phila., 1871. — Pal. Ohio, Vol. 1, 1873, page 206, plate 18, fig. 4, left view of internal cast, retaining some fragments of the thin shell. Meek says: "This is another type very unexpectedly found among the *Corniferous* specimens," viz., from Dublin, Franklin Co., Ohio. *Solemya** is Lamarck's old genus of 1818 (Hist. Vol. 5, p. 488). "No example of this group has ever before been obtained from any horizon below the *Mountain limestone*," *XI.* For the Carb. and Permian species King proposed the generic name *Janeia*, which he afterwards abandoned. This *S. vetusta* is perhaps nearer the Russian *Permian S. biarmica*, than to the Belgian Carb. *S. puroziana*, or *S. primæva.* — *VIII a.*—*Note. *Solen* and *Mya;* therefore now more properly written *Solenomya.*



Solenopleura holematopa, Agelin. (Pal. Scand. p. 26.) Walcott, Bull. No. 10, U. S. G. S. page 36, plate 6, fig. 3 type for genus, after Angelin. *Cambeian.*

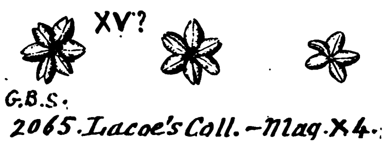


Solenopleura nana. Ford (1878, Am. Jour. Sci. [3] Vol. 15, p. 126), Walcott Bull. U. S. G. S. No. 30, p. 214, plate 27, fig. 3, *enlarged.* — *Lower Cambrian* (*Georgian*) *Conglomerate limestone* near Troy, N. Y. *L. C.*

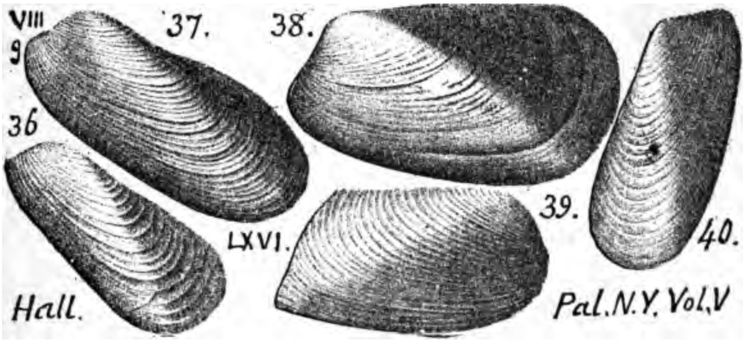
Solenopleura orestes, Matthew. See **Ptychoparia** ovestes. Walcott.

Solenopleura robbii, Matt. **Ptychoparia robbii.** Walcott.

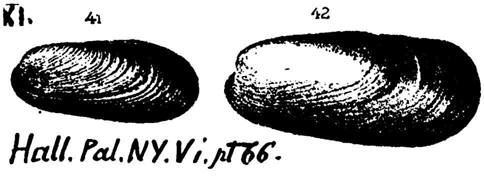
Sorocladus dispersus, Lesq. G. B. Simpson's drawing (1889) of Specimens Nos. 2065 *a*, *b*, *c*, in W. Lacoe's collection at Pittston, Pa., from Cassville, W. Va. *Upper Coal Measures. XV.*


XV?
G.B.S.
2065. Lacoe's Coll. – Mag. X 4.

Spathella typica, Hall, (in part, *Sanguinolites ventricosus*, W. & W. Hall, Pal. N. Y. Vi, p 883, p. 407, plate 66, figs. 36 to 40, right and left valves, showing variations in form and proportion of shells evidently belonging to the family of the *Stone-borers* (*Lithophagi*,) but not referable to any known genus; easily recognized by their sub-cylindrical form, and distant lamellose elevated striæ, which make a regular curve over the hind part of the shell, turning forward toward the hinge line; a character of surface somewhat like ***Macrodon;*** but without radiating striæ, and with a short hinge line. Found near Elmira and Ithaca, N. Y., and in Sullivan, Tioga and Bradford Cos., Pa. See spec. 850 – 4 (doubtfully), and 850 – 26 (OOO, p. 221) from Lawrenceville, Tioga Co., Pa., associated with *Spirifera disjuncta*, in *Chemung strata. VIII g.*



Spathella ventricosa. (*Orthonota ventricosa*, W. & W Proc. Bost. N. H. S. VIII, 1862; *Sanguinolites ventricosus* W. and W. in Miller. Hall, Pal. N. Y., Vol. V, 1883, page 408, plate


XI.
41
42
Hall. Pal. NY. Vi, pl 66.

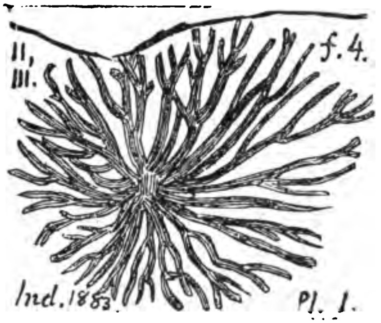
66, figs. 41, 42. two left valves, from *Yellow* (*Subcarboniferous*) *sandstone*, Burlington, Iowa. *XI.* — *See Sanguinolites ventricosus, above.*)

Spermophagus vivificatus, Scudder. A beetle found in *Oligocene tertiary beds* of Florissant, Colorado. Zittel's handbuch, fig. 1019, (*four times magnified.*) — *Tertiary.*

Sphœrexochus parvus, Billings. A little crustacean of *Chazy age.* Pal. Foss. 1865. Geology of Canada, 1863, page 133, fig. 66. (There is a *S. canadensis*, Bill. in the Anticosti or Clinton rocks, and a *S. romingeri*, Hall, in the *Niagara limestone*) — *II b.*

Sphærium striatinum, Lamarck. One of the forms making up the shell marl in Harmonsburg, Crawford Co., and elsewhere. (Q4, 41.) *Postpleiocene.*

Sphærococcites sharayanus. Goeppert. A round flat disc-like plant; with branches radiating starlike all around it; the branches rigid, forking from the base, flat, and cut square at their ends; found in very old Lower Silurian rocks of Bohemia, in company with *Chondrites antiquus and Buthrotrephis flexuosa.* Collett's Indiana Report of 1883, page 28, plate 1, fig. 4, intended to illustrate the forms which may be found in the American *Hudson river*, and older formations—*II*, *III.*



Sphærodoma, a genus of fossil gasteropods established by C. R. Keyes, in Proc. Ac. Nat. Sc. Phil. 1889, parts 2 and 3; where the following synonyms are noted:—

Sphærodoma cooperensis (*Mœcrocheilus cooperense*, Swallow,) *Kaskaskia limestone.* *XI.*

Sphærodoma littonana (*Natica littonana*, Hall; *Naticopsis littonana*, Meek & Worthen; *Macrocheilus littonanum*, Whitfield). *Warsaw limestone*, *XI.* (*See figure on page 371 above*).

Sphærodoma medialis (*Macrocheilus mediale*, Meek & Worthen; *Soleniscus medialis*, White; *M. pulchellum*, M. & W.; *M. intercalare*, M. & W.) *Upper Coal Measures*, *XV.* (*See figure on page 372 above.*)

Sphærodoma pinguis (*Macrocheilus pingue*, Winchell,) *Kinderhook beds. XI.*

Sphærodoma ponderosa, (*Macrocheilus ponderosum*, Swallow; *Soleniscus ? ponderosus*, White.) *Upper Coal Measures. XV.* (*See figure on page 372 above.*)

Sphærodoma primogenia, (*Stylifer primogenia*, Conrad; *Macrocheilus primogenium*, Hall; *Soleniscus primogenius*, White; *Fusus inhabilis*, Morton, 1836.) *Lower Coal Measures. XIII.* (*See figure on page 373 above.*)

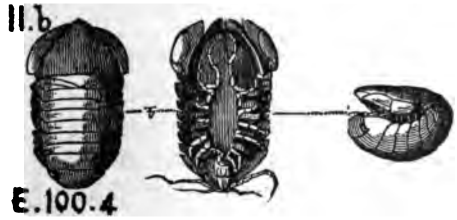
Sphærodoma prisca (*Maerocheilus priscum*, Whitfield,) *Upper Helderberg*, *VIII a.*

Spærodoma subcorpulenta (*Machrocheilus subcorpulentum*, Whitfield, (? = *S. cooperensis.*) *Kaskaskia limestone. XI.*

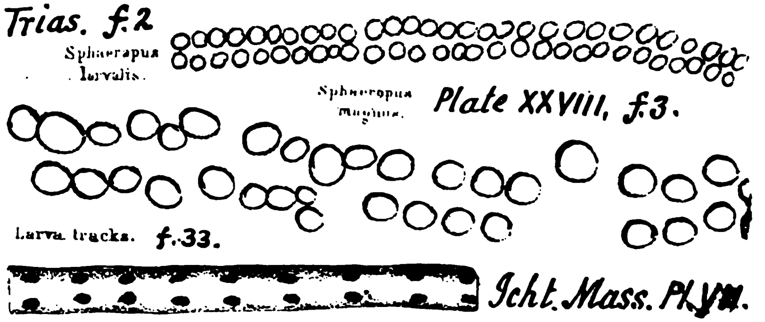
Sphærodoma texana (*Macrocheilus texanum*, Shumard; *Soleniscus texanus*, White.) *Coal Measures*, *XV.* (*See figure on page 374 above.*)

Sphærodoma has also been called *Buccinum* by Sowerby and others (not Linneus) in part.—Also, *Buccinites* by Schlotheim.—Also, *Plectostylus* by Conrad (not Beck, 1837.)—Also, *Duncania* by Boyle, 1879—Also, *Macrocheilina*, by Boyle, 1880. (C. R. Keyes.)

Sphæroma bubastiformis. Emmons, Geology of the Second (northern) District of New York, 1842, page 390, fig. 100, 4. Figure of a *living* crustacean used for comparison with the ancient extinct trilobites.



Sphærapus larvalis, *tracks*. Hitchcock, Ichn. Mass. 1858, page 164, pl. 28, f. 2, track of the grub or larva of some insect, to judge by a comparison of the known track of a larva. Turner's Falls. *Trias*.


Trias. f.2
Sphærapus larvalis.
Sphæropus magnus.
Plate XXVIII, f.3.
Larva tracks. f.33.
Icht. Mass. Pl. VII.

Sphærapus magnus, *tracks*. (Figure given under *S. larvalis*.) Hitch. p. 164, pl. 28; f. 3, *reduced* outline of the double track of some insect grub or larva (like that made by the *Acer saccharinum*, which feeds on fallen rock-maple leaves, the tracks of which are figured on plate 7, fig. 33;) width of trackway nearly an inch; pits generally almost touching each other, but when the course changes the outer ones are nearly half an inch apart, either because the animal really had legs, or because its muscular rings stretched apart. Turner's Falls, hard red shale. *Trias*.

Sphæropezium leptodactylum, King, Am Journ. Sci. Vol. 48, 1845, page 345, (*figs. see Appendix*.) The tracks of some five toed quadruped (batrachian?) consisting of a round depression made by the ball of the foot and five depressions made by the toes, in a sandstone of the *Coal measures* in Westmoreland Co., Pa. XIII? XIV?

Sphæropezium ovidactylum, King. The same.

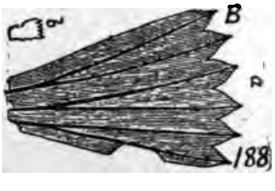
Sphæropezium pachydactylum, King. The same.

Sphæropezium thærodactylum, King. The same.

Sphagnum. A peculiar family of plants, the decay of which produces *Peat;* quite different from the mosses which grow upon the surface of a peat bog in great profusion and beauty. "In somewhat dry bogs the *Sphagna* grow close together; either loose and upright, or in half globular hummocks; so closely pressed against each other that the hand cannot penetrate the tufts without heavy pressure. In ditches full of water they float, expanding their branches in every direction, gradually covering the whole surface of the water; bearing blackish round capsules full of pulverulent matter, the seeds. But even in the driest parts of bogs the sphagnum plants are always as full of water as a soaked sponge," which they imbibe from the boggy atmosphere and rain. (Lesquereux, Manuscript Autobiography, May, 1886.) White clay is produced at the bottom of most of the peat bogs. Lesquereux first studied the transformation of *peat* to coal at the Lignite mines of Bischoffsheim in Germany. His exposition of the facts appeared in the Revue Suisse; ("Explorations dans le Nord, p. 15, Geneva, 1846.) The peat diggings at Lutzen near Leipsig made the demonstration more specific; the bogs of the German coast and the Dismal Swamps of Virginia and N. Carolina contributed other important facts; and years of study of the Coal Measures of Pennsylvania and other States perfected the accepted theory of the origin of coal from Sphagna.

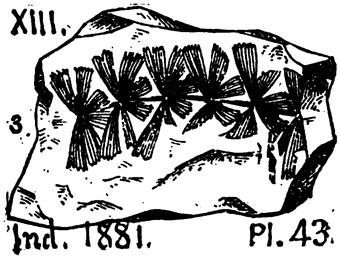
Sphenophorus lilleyi, Newberry, Monogram XVI, U. S. Geol. Sur. 1889, page 92, plate 20, fig. 15. A unique fragment of the shoulder blade (clavicle) of a fish; a flattened bone 6″ by 1½″, ornamented by many rows of arrow head shaped tubercles, closely set behind each other, the points directed forward. "This strong and elegant ornamentation differs so much from that of any other known fish, that it will serve to identify even the smallest fragment." Probably a Crossopterygian Ganoid fish, having affinities with *Holoptychius* and *Onychodus*. The cephalic bones of the latter genus are covered with somewhat triangular appressed tubercles, which I have compared to double cones flattened down on their sides. Some of the bones of *Sauripteris* also exhibit a style of ornamentation closely allied to this." Found by Mr. Lilley, at Leroy, Pa., in *Chemung VIII g.* (Fig. in Appendix.)

Sphenophyllum antiquum. Dawson, Acad. Geol., 1858, page 540, fig. 188 B, *a* magnified, *b* natural size. Canadian Nat. Vol. 6, p. 170, f. 7. Found as detached leaflets in the graphitic *Devonian shale* at St. John, N. B. Wonderfully preserved in form and venation, although changed to films

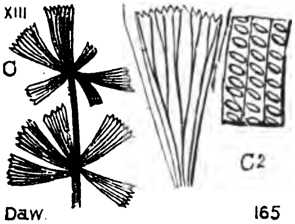


of graphite. A specimen from Carlton shows arrangement of 8 leaves in whorl. A beautiful plant quite different from any *Spehenophyllum* of the Coal age. *VIII–IX*.

Sphenophyllum bifurcatum, Lesquereux. Geol. Rt. Arkansas, Vol. 2, p. 809, plate 1, fig. 2. — Coal Flora, p. 55, plate 2, figs. 10, 10*a*, very like *S. Saxifragœpolium*, *Subconglomerate coal* of Arkansas and (Harmon coal) Kentwick. Reported in White's collections from the Waynesburg coal of the *Monongahela series* (OOO, p. 254, Spec. C4, 8.) — *XI* and *XV*.

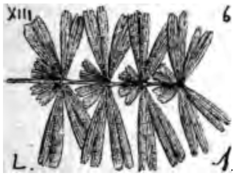

XIII.
3.
Ind. 1881.
Pl. 43.

Sphenophyllum emarginatum. Brogniart. (1828, Prodr. Hist. Veg. Foss.) Collett's Indiana Report of 1881, page 375, plate 43, fig. 3, natural size, Lesquereux, Coal Flora page 53.) Differs from *S. schlotheimii*, Ll. & Hutt. only by longer leaves, cut horizontally, not rounded, at the upper margin, and the primary veins joined at the base and less divided. Not common. Found in Duguoin coal, Ill., and in the anthracite *Gate vein* at Pottsville. Pa. It is assigned to the *Upper coal measures ;* and therefore it is not surprising to see it in Spec. C4–8, –10 (OOO, 254) from the *Waynesburg coal*, Greene Co., Pa., at the top of the *Monongahela series*. But the *Gate vein* is not a high coal, and White reports it in Lesquereux's list from under the *Darlington bed* (*Allegheny series*), Q, 54; and again from the base of the *Pottsville cong.* in Wyoming Co. (G7, 39) in both cases with *S. schlotheimii*. *XIII* to *XV*.



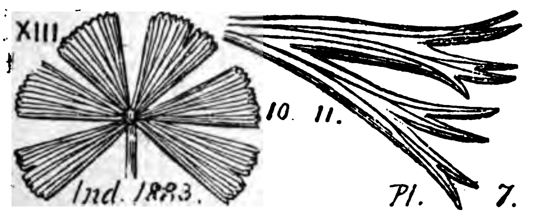
Sphenophyllum erosum, Lindley and Hutton. Dawson's Acadian Geology, 1868, p. 444, fig. 165, *c ; c 1*, *enlarged* leaflet; *c 2*, scalariform vessel, *magnified.* "One of the prettiest of the plants of the Coal age, its little whorls of wedge-shaped leaves, often scattered thickly over the surfaces of the shales, resembling flowers"; stem very slender, branching copiously; leaves often toothed and veined like fern leaves; spores on small spikes like *Asterophyllites ;* five species recognized in Nova Scotia coal fields;

tissues ladder shaped (scalariform) not easily recognized, so that we do not know how far they helped to make coal. (A *Sphenephyllum emarginatum* in Logan's collections from New Brunswick allowed Dawson to ascertain that its stem had a simple axis of one bundle of ladder-shaped vessels *Tmesipteris* figured by Brongniart. These curious plants were no doubt cyptogamous, growing like the horse-tails, with fern-like leaves, and *Lycopod* fruit. (Dawson.) *XIII.*

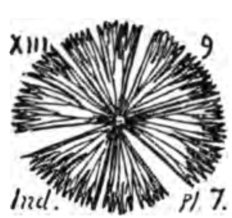


Sphenophyllum filiculme (*Sphenophyllites oblongifolia.* Gutb.) Lesq. Geol. Pa. 1858, p. 853, pl. 1, fig. 6; of peculiar aspect, and easily recognized, looks like an *Annularia.* The unequal length of its leaves is an *invariable* characteristic; in all specimens the whorls have 6 leaves, the two at the side being twice as long as those below them. Explained by Lesquereux in Coal Flora, 1880, p. 58, as due to mode of growth in expanding their ramifications at the surface of the water. Whole extent of *Coal measures;* Rhode Island anthracite; New Phila. and Pottsville Gate anthracite; a fine branch from Clinton, Mo.; specimens from *upper coal measures* of Virginia by Fontaine and White. Lesq. *XIII. XV.*

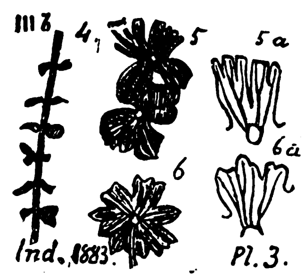
Sphenophyllum fontainianum, S. A. Miller, Am. Pal. Foss., 2d ed., 1883; proposed for *S. latifolium,* Fontaine & White, P 2, 1880.—*Permo-Carboniferous.* *XVII.*


XIII
10 11.
Ind. 1883.
Pl. 7.

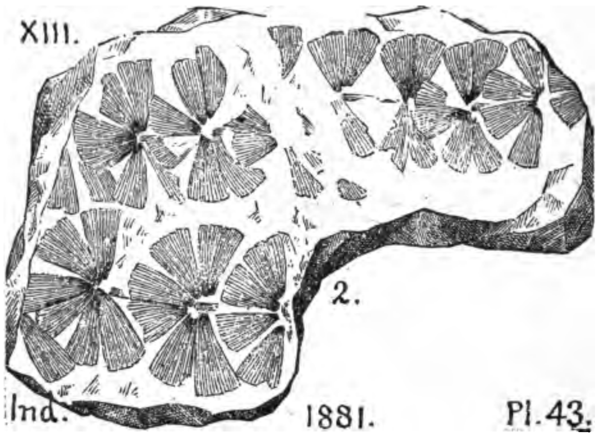
Shenophyllum longifolium. (*Sphenophyllites longifolius,* Germ. Gis., plate 2; verstein, plate 7.—Geinitz, etc., etc.—*Sph. latifolium,* Wood, Trans. Amer. Phil. Soc. Vol. 13, plate 8.—Lesquereux Coal Flora, page 53; page 726, plate 91, fig. 6, from *Subcarb.,* Arkansas.) Collett's Ind. Rt. 1883, p 46, plate 7, fig. 10, 11. Rare; low coal, Clinton, Mo.; also *Pittsburgh coal,* W. Pa., and under the *Darlington coal* in Beaver Co., Pa. *XI, XIII, XV.*



Sphenophyllum oblongifolium. (*Sphenophyllites oblongifolius*, Germar; Gein.; Schimp.; etc. Lesquereux Coal Flora, page 57.) Collet's Indiana Report of 1883, page 47, plate 7, fig. 9, a rare species found at Cannelton, Beaver Co., Pa. It makes no difference whether the ends of the leaves are whole or toothed. Lesquereux describes it from Clinton, Mo., which he calls Coal B or C (C. Fl. p. 879). Lacoe identifies it (MS. list, May 12, 1890) as Specimens (2) No. 766 of Koch's collection at Tipton mines, Blair Co., Pa., where the coal beds are in the *Pocono sandstone* — NOTE. Lacoe says this species is found in the "Low coal" of Arkansas, Alabama, etc.; Bituminous A, B, C; in the Anthracite D, E; and Waynesburg Coal. *X* to *XV*.

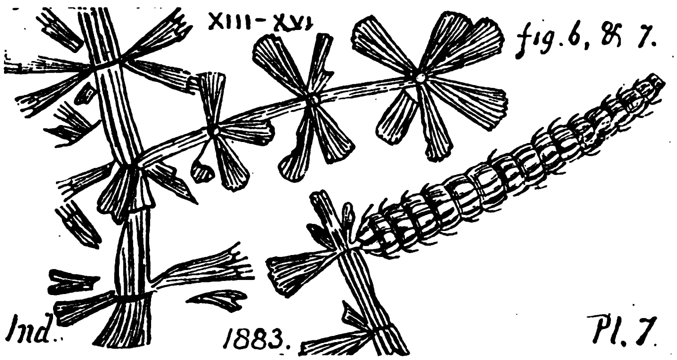


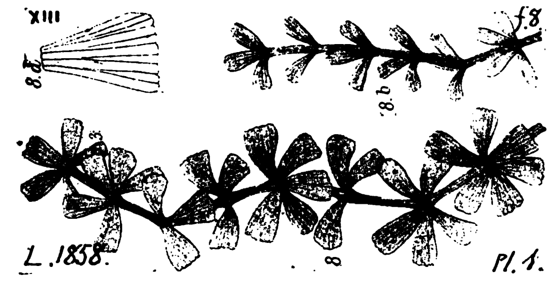
Sphenophyllum primævum, Lesq. Proceedings of the American Philosophical Society, Phila., Vol. —, page —, plate —, fig. —; reproduced by Collett in Indiana Report of 1883, page 17, plate 3, figs. 4, 5, 6. *Hudson river* (Cincinnati) formation. — NOTE. These imperfect fragments seem closely allied to *Sphenophyllum schlotheimii*, which see. (Collett). *IIIb*.



Sphenophyllum schlotheimi, Brongniart. Collett's Indiana Report of 1881, page 374, plate 43, fig. 2, *natural size*, a few whorls on shale. (See Lesquereux, Coal-Flora, Report P, page 52, plate 2, fig. 6, 7, which gives the fruit, from

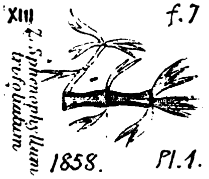
(*Sphenophyllum schlotheimi*, continued.





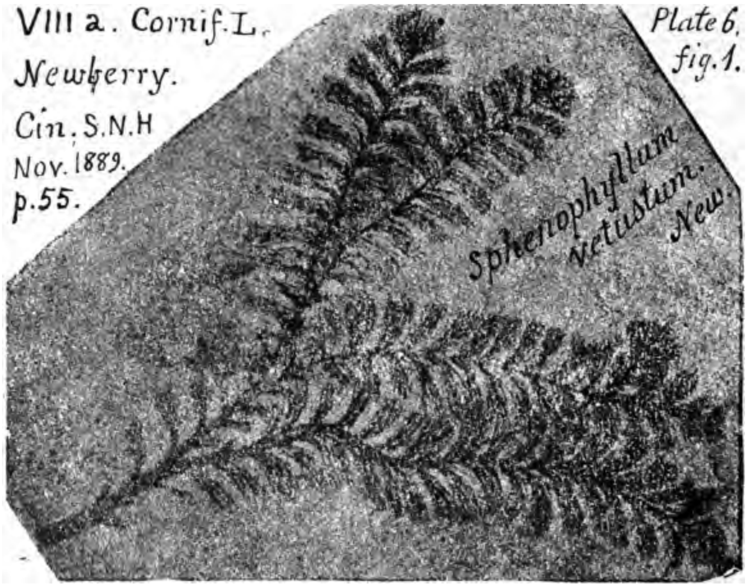
the shales of the Anthracite Gate Vein at Pottsville, Pa.) Collett's Indiana Report of 1883, page 46, plate 7, figs. 6, 7, 7 *a*, a most common and beautiful species, easily known by the rounded upper borders; ranging from the *Conglomerate* to the top of the *Coal Measures.* (Collett.)—See Spec. C4–4 (OOO, p. 254) from the *Waynesburg* coal of Greene Co., Pa. See what is said under *S. emarginatum* above. Found also by White in the roof of *Fulton* (*Cook*) *bed*, Old Barnet mine Broad Top, Huntingdon Co. (T3, 315). NOTE.—But its range is still greater; for it has been recently recognized Mr. Lacoe, in two specimens (No. 761) in Koch's collection from the Tipton mine, Blair Co., Pa., in one of the beds in the *Pocono formation*, *No. X*, 600′ below the base of the *Conglomerate.* In Mr. Lacoe's list of this collection (May 12, 1890), he notes that *S. schlotheimii* is found in European coal measures, in British America; in the "Low coal" of Arkansas, Alabama, etc., etc.; in the Anthracite beds A, B, C, D, E, etc., and in the Bituminous beds A, B, C, D, E. *X* to *XV.*

Sphenophyllum tenerimum, Stur, Culm Flora, 1887, page 104; Lesquereux, Coal Flora of Pennsylvania, 1880, page 728. *Coal measures.* *XIII.*



Sphenophyllum trifoliatum, Lesq. Geol. Pa., 1858, p. 853, plate 1, fig. 7; small fragment of **Sphenophyllum erosum**, Ll. & Hutt. (*S. dentatum* Bgt.; *S. emarginatum*, Gein.; *S. saxifragæfolium*, Com. & Kx.; *Rotularia polyphylla*, St.; *Sphen. quadrifidium*, & *S. fimbriatum*, Bgt.; etc. See Lesq. Coal Flora, 1880, p. 55). Rare in American coal measures. Lesq. has a good variety from Pittsburgh coal at St. Clairsville, O.—*X V.*

Sphenophyllum vetustum, Newberry, Jour. Cincinnati Soc. Nat. Hist., Oct., 1889, page 55, plate 6, fig. 1, *natural* size, branch with branchlets and leaves; a unique specimen, imperfectly preserved, of one of the most ancient land-plants yet discovered, having the general aspect of the submerged branches of *S. erosum*, Brongt.; "but the brushlike appearance may be due to the skeletonizing of the leaves by maceration." (Newb.) The impression and its counterpart (now in the cabinet of the Wesleyan University, Delaware, Ohio), was found by Prof. E. T. Nelson in the upper part of the *Corniferous limestone* (U. Held.) formation, at Delaware, O., a marine deposit, abounding in shells and fish-remains; but numerous



other land-plants were found with it. The stem was woody, for it has been replaced by coaly matter. *VIII a.*

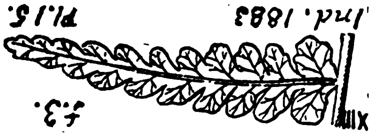
Sphenophylla numerous over the *Pittsburgh coal* at Jeffries mine, Wash. Co. (K. 305). Fine specimens to be got in the roof of the *Redstone* coal (K2, 254). Over *Waynesburg coal* (K, 59). All *XV.*

Sphenopteris. See **Pseudopecopteris abbreviata.** *XIII.*

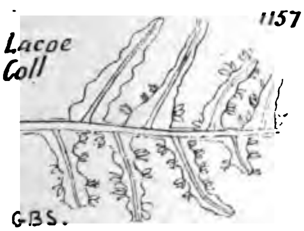
Sphenopteris affinis, Ll. and Hutton. A plant of the European and British American *coal measures*; also occurring in the very bottom of the *Lower Carboniferous*, in the *Calciferous sandstone* (not the *Lower Silurian* American formation of that name, but) the formation which immediately overlies the British *Devonian* (Seeley.) This is the more remarkable as it has recently been recognized by Mr. Lacoe (MS. list May 12, 1890) in specimen No. 1266 of Koch's collection at Tipton, Blair Co., Pa., in the *Lowest Carboniferous* (*Pocono sandstone*) *formation No. X.* NOTE. — What seems to be the European *Calc. SS.* crops out along the face of the Allegheny Mountain in Blair Co, at the top of the *Pocono formation*, or at the bottom of the *Mauch Chunk red shale* (*XI*) some hundreds of feet above the Tipton coal mine.

Sphenopteris artemisiæfolia. See **Eremopteris art.** *XIII.*

Sphenopteris brittsii. (Lesquereux, Coal Flora of Pa., 1880, page 277, plate 55, figs. 2, 3, 3*b*, from Clinton, Mo.; and 1882, page 764, page plate 102, figs. 3 — 4*a*, from coal bed No. 6, near Nelsonville, O., large and beauiful specimens. — *XIII.*



Sphenopteris coralloides, (Gutb.) Lesquereux. G. B. Simpson's drawing (1889) of specimen No. 1157 in Mr. Lacoe's collection at Pittston, Luzerne Co., Pa.



Sphenopteris cristata. (*Pecopteris cristata*, Brongniart). Lesquereux's Coal Flora, p. 273, Mazon creek, Ill., and under *Subconglomerate coal* of Mercer Co. Also probably in Rhode Island anthracite beds.—Four specimens (C4-6) are reported by White from the roof shale of the *Waynesburg coal*, Greene Co., Pa., *Monongahela series*. XV. (OOO, p. 254)—*XV.*—Spec. 3126 (O, 140) is labelled as from the *Bond Vein* mine, at Alton, McKean Co., (= *Sharon coal*) above the *Olean conglomerate*. *XII.*

Sphenopteris decipiens. See **Pseudopecopteris decipiens.** *XIII.*

Sphenopteris dissecta, Brgt. Veg. Foss. p. 183, pl. 49, figs. 2, 3, is recognized by Lesquereux in specimen No. 371 of Lacoe's collections at Pittston, Luzerne Co., Pa., got from Carbon Hill anthracite mine on *coal bed D*, Old Forge township, Luzerne Co., Pa. See additions to Coal Flora, 1884, P, page 836. *XIII.*

Sphenopteris erithmifolia. See **Eremopteris artemisiæfolia.** *XIII.*

Sphenopteris fasicularis. Roem. Beitrag., IX, 179, pl. 28, f. g. Species difficult to define; possibly a *Rhacophyllum;* recognized by Lesquereux in Spec. No. 367 of Lacoe's collections at Pittston, Pa., from Anthracite mine at Oliphant; also found in *Kittanning bed*, at Cannelton, Beaver Co., Pa. Lesq. additions, P, 1884, p. 837. —*XIII.*

For figure
see
Appendix.

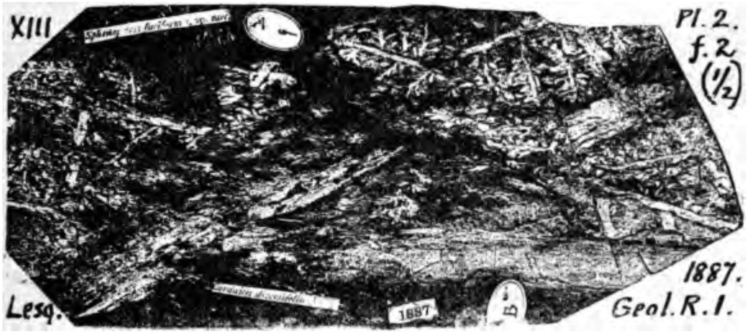
Sphenopteris flaccida, Crepin. Bull. Acad. Roy. Belgium, 1874, pl. 2, f, 1—5.—Lesq. Coal Flora, 1880, p. 29. Allied to *S. linearis*. Brgt. Found by Lesquereux among Ashburner's collections at the E. Broad Top RR. tunnel through Sideling hill, Huntingdon Co., a number of specimens, especially stems, with branches and pinnules. (The European species occurs with *Archæopteris hibernica* and other subcarboniferous forms in the *Condroz stage.*) See T3, 88.—In Perry Co., also, at Foose's tunnel in South Cove mountain, Claypole gathered two boxes full, identified also by Lesquereux (OOO, 158; Spec. 12,520.)—*Pocono sandstone.* *X.*

Sphenopteris flexicaulis, Lesq., G. Sur. Ark., 1860.

Sphenopteris foliosa, Fontaine and W. Report P 2, 1880, page 44. *Permo-carboniferous. XVII.*

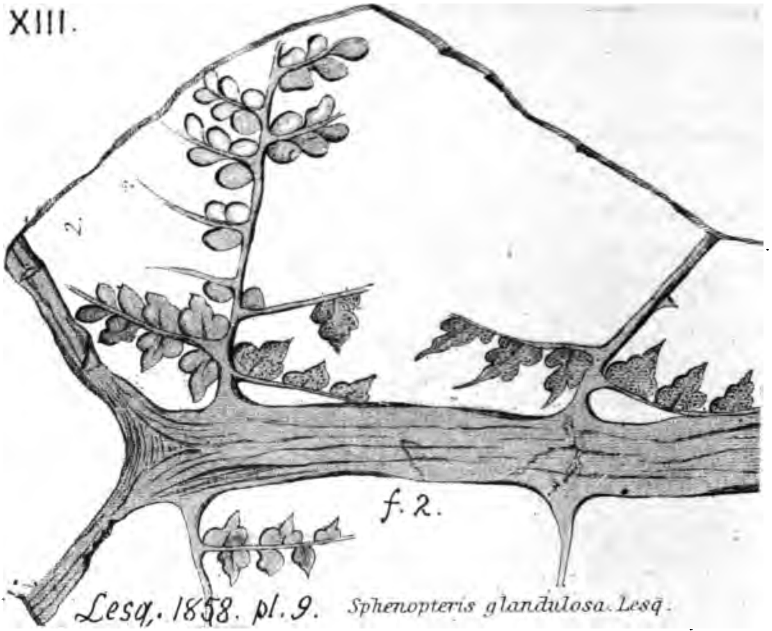
Sphenopteris flagellaris. See **Oligocarpia flagellaris.** *XIII.*

Sphenopteris fuciformis, Lesquereux. American naturalist, Vol. 18, 1884, page 922. Figure taken from Franklin Society Report, Geol. Rhode Island, Providence, 1887, page 68, plate 2, fig. 2, *half size*, new species found in the Rhode Island anthracite coal. *XIII.*



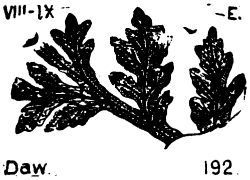
Sphenopteris furcata. (*Hymenophyllites furcatus*, Goeppt.; Gein.; Schimp.; Lesq. Illinois Rt. 4, p. 470 *Sph. flexuosa*, Guth.; — *S. alata*, Guth. — *S. membrancea*, Gutb.) Lesq. Coal Flora, p. 282. Rare in American coal measures. Found in *Subconglomerate*, opposite Mauch Chunk, Carbon Co., Pa.; and also good spec. in *Subc. coal* of Tenn. — Reported by White in base of *Pott. Cong.* Luzerne Co. (G7, 39).— In *Hunt.* Co., E. B. T. RR. tunnel, Sideling hill, many branches of it. *Pocono* (T3, 88.) — *X; XII.*

Sphenopteris glandulosa. Lesq. Geo. Pa., 1858, p. 862, pl. 9, fig. 2; all the leaflets are thick, convex, glandular-punctuate, rough, and the nervules entirely obsolete. This beautiful species was found at a mine west of Shamokin, in the western Middle Anthracite field of Pa. Resembles *S. linkii* Gopp. of Europe, except for its rough surface, and much larger size; differs from the European *S. obtusifolia* of Bgt. by the glandular surface of its leaflets. — *XIII.* (*Fig. on page 986.*)



Lesq. 1858. pl. 9. Sphenopteris glandulosa. Lesq.

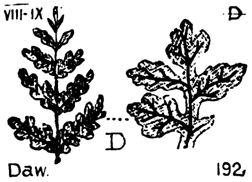
Sphenopteris harttii, Dawson. Acad. Geol. 1868, page 551, fig. 192 E; closely resembling *S. alata*, from Port Jackson, but differing in details; *Upper Devonian* shales at St. John, N. B.— *VIII–IX.*



Sphenopteris hildreti. See figure under *Hymenophyllites hildreti*, on page 292 above. *XIII.*

Sphenopteris lesquereuxii. **Pseudopecopteris lesq.** *XIII.*

Sphenopteris marginata, Dawson. Acad. Geol. 1868, p. 551; fig. 192 D, resembling the smaller *S. hœninghausi*, Brgt. found with it in the New Brunswick *Upper Devonian* shales at St. John, one of Mr. Hartt's fronds being six inches long. *VIII–IX.*

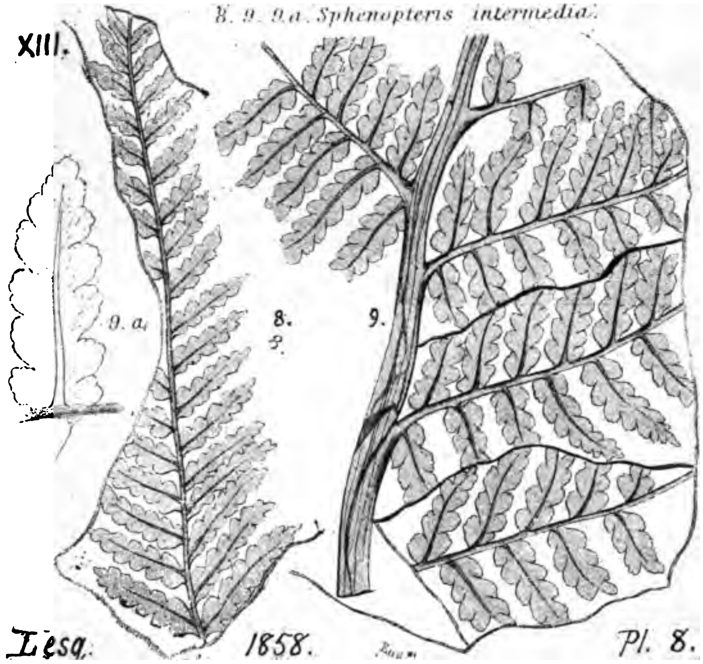


Sphenopteris macilenta. L. & H. See **Pseudopecopteris macilenta,** Lesq. Coal Flora, p. 219. Has two **forms,** one

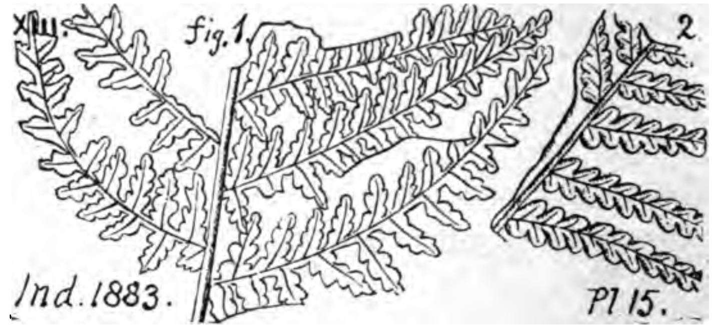
Gutbier's *S. lobata*. Closely allied to *S. irregularis*. One spec. from Albany, one from Cannelton, Beaver Co., Pa. White reports it from the *Sharon coal*, Mercer Co., and from the same horizon, low in the *Conglomerate*, in Lawrence Co. (Q^3, 53; Q2, 97.) *XII.*

Sphenopteris marginata. **Eremopteris marginata.** *XIII.*

Sphenopteris mediana (*intermedia*. Lesq. Geol. Pa., 1858, p. 862, pl. 8, figs. 8, 9, 9 *a;* so called because coming between two European species; *S. chærophylloides*, Sternb. having longer secondary leaves, the short leaflets united half their length, and *Pecopteris athyroides*, Bgt., the leaflets being deeper toothed. Abundant in the lower anthracite beds of Pa. Also in Mazon cr. nodules, Ill. Coal Flora, p. 271. *XIII.*



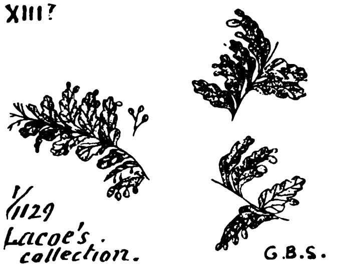
Sphenopteris mixta. Schimper. — (Lesquereux, Illinois Report, Vol. 4, plate 15, f. 7. Coal Flora of Pa., 1880, page 276, plate 54, figs. 1 to 3 *a*, from Clinton, Mo.) Collett's Indiana Report of 1883, page 67, plate 15, figs. 1, 2, to show the variability of its leaflets. In Beaver Co., Pa., under the *Dar-*



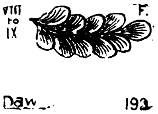
lington coal at Cannelton. (Q, 55.) *XIII.*

Sphenopteris newberryi. See **Pseudopecopteris newberryi.** Found in Beaver Co., Pa , under the *Darlington coal.* (Q, 55.) *XIII.*

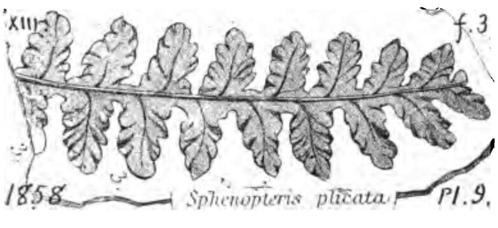
Sphenopteris (*Hymenophyllum*) **pendulata,** Lesq. G. B. Simpson's drawing (1889) of Specimen No. 1129, in Mr. Lacoe's collection at Pittston, Pa., from Dolomite, Alabama. *Coal Measures. XIII. ?*



Sphenopteris pilosa, Dawson. Acad. Geol. 1868, page 552, fig. 192 F, with a *Spheropteroid* venation, but the general appearance of a *Neuropterid* or *Cycloptertid*, and somewhat resembling *C. decipiens* of the Coal Age. *Upper Devonian* rocks at St. John, N. B. *VIII-IX.*



Sphenopteris plicata, Lesq. Geol. Pa., 1858, p. 862, pl. 9, f. 3; imperfect; but a distinct and peculiar species; found at old shaft (? Gate Vein) behind New Philadelphia, Schuylkill Co , Pa. — Coal

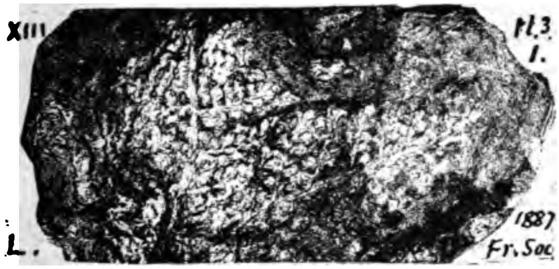


Flora, pp. 292 and 763, pl. 111, fig. 28; of Lacoe's No. 997, specimen, from Mazon creek nodule. Species apparently very rare. *XIII.*

S. pseudomurrayana, Lesq. C. Flora. *XIII.*

S. royi, Lesq. C. Flora of Pa. *XIII.*

Sphenopteris salisburyi, Lesquereux (May, 1887), figured and described in the Franklin Soc. Report on the Geol. Rhode Island, 1887, page 69, plate 3, fig. 1; closely related to *S. crepini,* Zeiller, of the European coal basin of Valenciennes. Compare also *S. delicatula,* St. (See Q. J. G. S. Lond. 1884, plate 24, f. 2.). — *R. I. Coal measures. XIII.*

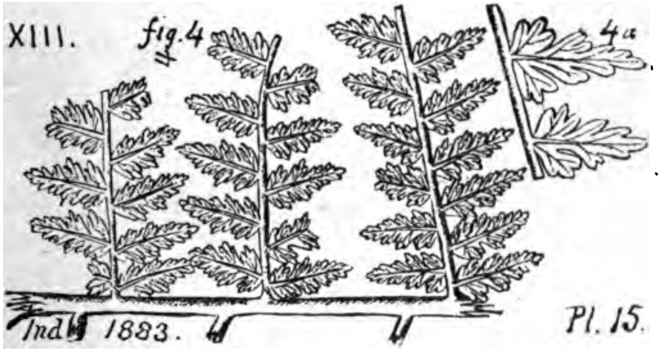


S. solida, Lesq. C. Flora. *XIII.*

S. squamosa, Lesq. C. Flora. *XIII.*

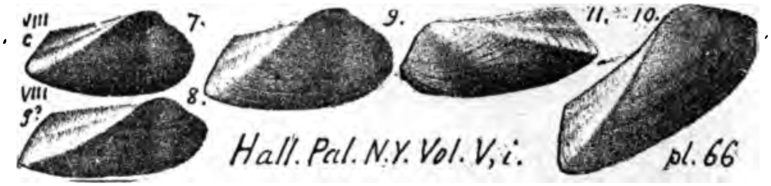
Sphenopteris stricta, Europe. See **Eremopteris artemisiæfolia.** *XIII.*

Sphenopteris tridactylites. (Brogniart; Geinitz; Schimper; *Sphenopteris quadridactylites,* Gutbier; *Hymenophyllites pinnatifidus,* Lesq. Ill. Vol. 2, plate 34, fig. 2, 2 *a;* Coal Flora, Pa , 1880, p. 284, plate 55, figs. 8, 8 *a*, 9, 9 *b*. XI. Sub-



carb. up to XIII, Coal A, Grand specimen from XI, Ind., whetstone quarries. Coal 1, Mercer Co., Ill., etc.) Collett's Ind. Rt. 1883, page 69, plate 15, figs. 4, 4 *a*. NOTE — Represents the commonest ferns of *Subcarboniferous measures*. Collett. *XI*.

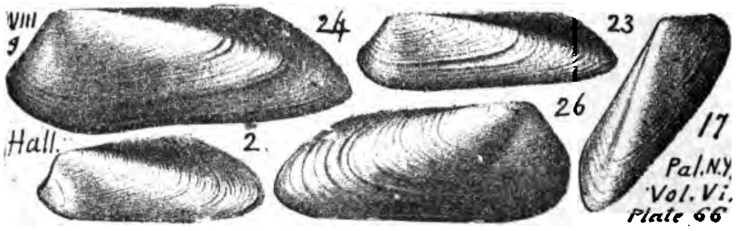
Sphenotus arcæformis (*Sanguinolites arcæformis*) Hall,



Pal. Not. Lam. 1870; Pal. N. Y. Vol. V; pl. 65, f. 7 to 11; erroniously *Sang. æolus*, Pal. N. Y. V i, pl. 66, f. 43. Differs from *S. cuneatus* by being smaller, with a narrower hind end, rounder base margin, less conspicuous post-cardinal ridge, and in its surface character, having extremely fine concentric striæ, sometimes bundled on the front part and waving on the back hinge slope; also fine ray striæ seldom well preserved and mainly confined to the hinder half of the shell. *Hamilton* shales, near Delphi, etc., N. Y.; and doubtfully near Smethport, Potter Co., Pa., in the *Chemung*. *VIII c*; (*VIII g?*)

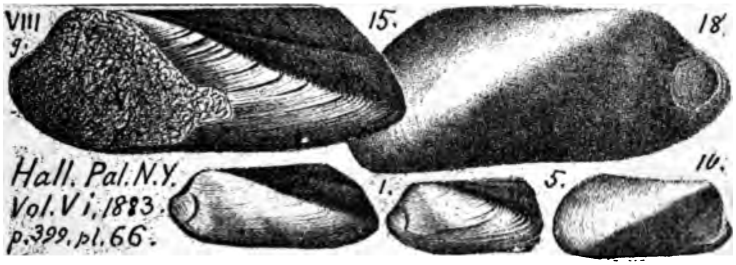
Sphenotus chemungensis. New Species. Simpson, Proc. A. P. S. Dec. 1888, OOO, p. 225. Spec. 855–24 (both valves; umbo broken off), from Sherwood's collections in Tioga Co., Pa., Sullivan township, from *Chemung upper beds*. *VIII g*.

Sphenotus clavulus, Hall. (*Sanguinolites ? clavulus*,

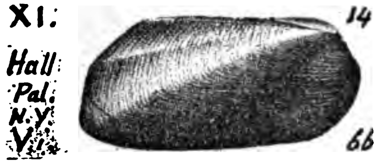


Prel. Not. Lam. 1870.) Pal. N. Y. Vol. V i, 1883, page 401, plate 66, selected figures 2, small left valve; 17, 23, 24, 26, from a series of valves showing variety of size and form; longer and narrower than other species, more arcuate, and without conspicuous fold or post cardinal slope. At Philipsburg and in loose pieces at Portville and Olean, N. Y. *Chemung*, *III g*.

Sphenotus contractus, Hall. (*Cypricardia contracta*, Hall, 1843. In part *Sanguinolites rigidus* (White & Whitfield), Hall, Prel. Not. Lam. 1870). Pal. N. Y. V i, 1883, page 399, pl. 66, f. 1 to 19, and pl. 94, f. 2. Resembles *S. cuneatus*, but umbonal ridge not so strongly marked, cincture less conspicuous, and hind end more pointed. Various places in West N. Y., Olean, etc., and Warren and Allegheny Springs, Warren Co., Pa. — Also quoted in OOO, p. 225, as the name of Spec. 855–23 (very narrow form), among Sherwood's Tioga Co. collections, Sullivan township, from *Chemung upper beds. VIII g.* — See *Cypricardites contractus, p. 178.*

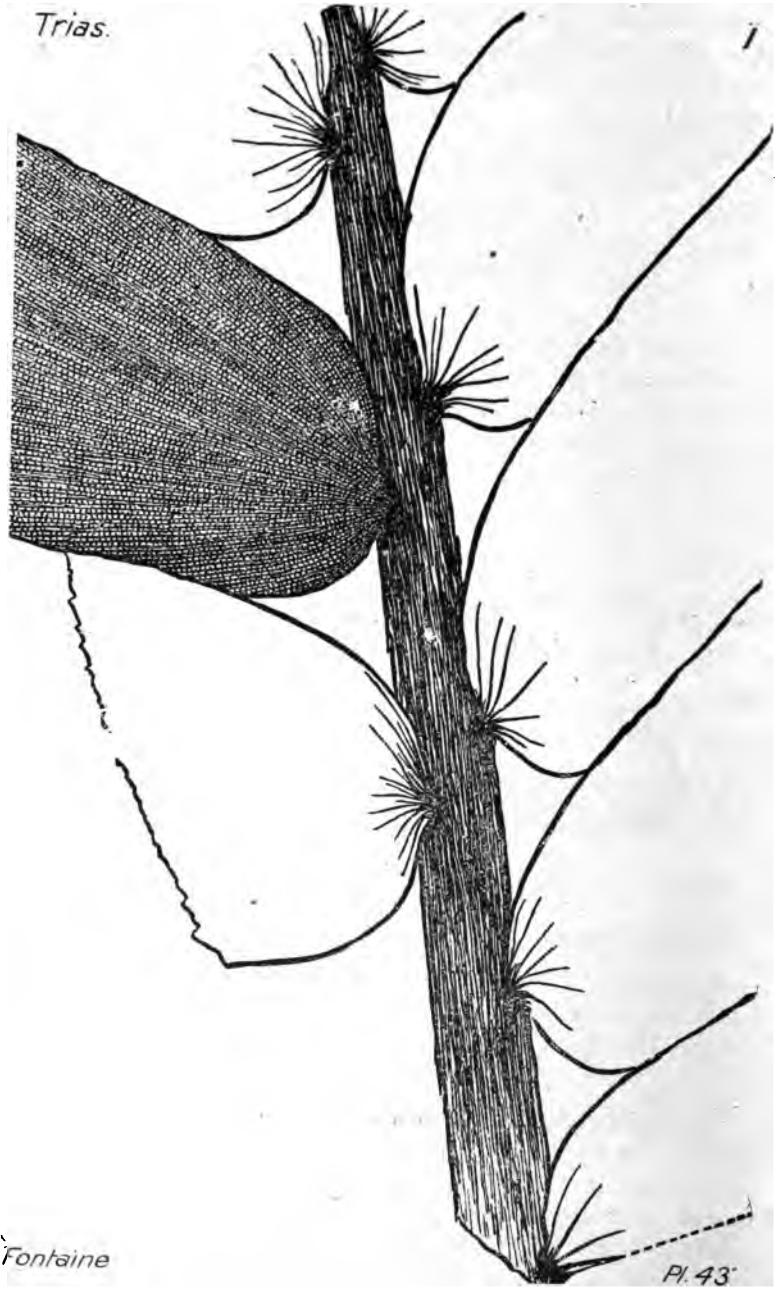

VIII g.
15.
18.
Hall. Pal. N.Y. Vol. V i, 1883. p. 399. pl. 66.
1.
5.
10.

Sphenotus rigidus (*Cypricardia rigida*, White & Whitfield, 1862; in part *Sanguinolites rigidus*, W. & W. Hall, Prel. Not. Lam. 1870.) Hall, Pal. N. Y. Vol. V i, 1883, page 402, plate 66, fig. 14, from original specimen from *Yellow Sandstones*, Burlington, Iowa; more robust, shorter, more rigid etc., form than *S. contractus* of the *Chemung formation* (Hall). *Subcarboniferous. XI.*



Sphenotus typicus, a very variable species of which probably are forms on Spec. OOO, 12,797 (3) I. C. White, Haun's bridge, Huntingdon Co., Pa. (G. B. S.) 175′ below *Chem. upper congl. VIII g.*

Sphenozamites rogersianus, Fontaine. Mon. U. S. Geol. Sur. Vol. 6, 1883, pp. 80–84, plate 43, fig. 1, part of summit of leaf of medium size. This splendid plant belongs to Saporta's genus, which first appears in the lowest European *Oolite*, abounds in the middle *Oolite* of the Venetian Alps, and ranges into the upper *Oolite*. In our Richmond coal measures (called


Trias.
1
Fontaine
Pl. 43

Trias) it occurs with *Rhœtic* plants. With a good lens on well preserved specimens the apparently sharply defined single nerves are seen to be really composed of two nerve strands; and the single strong nerves at the base of the leaflets, to be really nerve bundles. An entire leaf must have been a yard long. This is no doubt what Emmons figured as *Calamites punctatus* in his Amer. Geol. plate 6, fig. 5. Newberry figures it from Sonora, Mexico, where other plants like those of Richmond, Va., are found. Found *only* with the *Clover hill main coal bed. Trias.* (*Rhœtic.* Fontaine.)

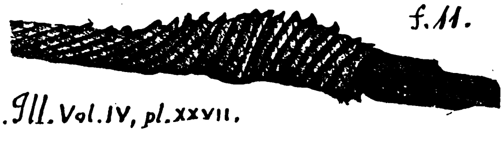
Spiders, fossil: In his description of a new spider from the Isle of Wight, detected in the British Museum by Rev. H. C. McCook (Proc. Acad. Nat. Sci. Phila. March–Sept., 1888, p. 202, On *Eoatypus woodwardii*, Cook), he remarks that the horizon in which most of the fossil spiders are found, both in Europe and America, is *Eocene Tertiary*.

Spiloblattina gardneri, Scudder. A cockroach from Fairplay, Colorado. Proc. Acad. Nat. Sci. Philada., 1855, p. 35. Figure ($\frac{5}{2}$ nat. size) in Zittel's handbuch, fig. 933. — *Trias.*

Spiloblattina guttata, Scudder. Ditto, p. 36. — *Trias.*

Spiloblattina marginata, Scudder. Ditto, p. 37.—*Trias.*

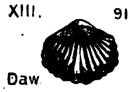
Spiloblattina triassica, Scudder. Ditto, p. 36. — *Trias.*



Spirangium appendiculatum, Lesq. (*Palœoxyris appendiculata*, Lesq. Pal. Ill., Vol. 4, p. 465, pl. 27, fig. 11.) Coal Flora, page 520, plate 75, fig. 12. Mazon creek nodules. — Reported by I. C. White as identified by Lesq. in base of *Conglomerate* at Campbell's ledge, Luzerne Co., Pa. (G7, 40). — See note by J. S. N. under *Spiraxis randalli*, respecting suggestion that these forms are fossil eggs of fishes. — *XII.*

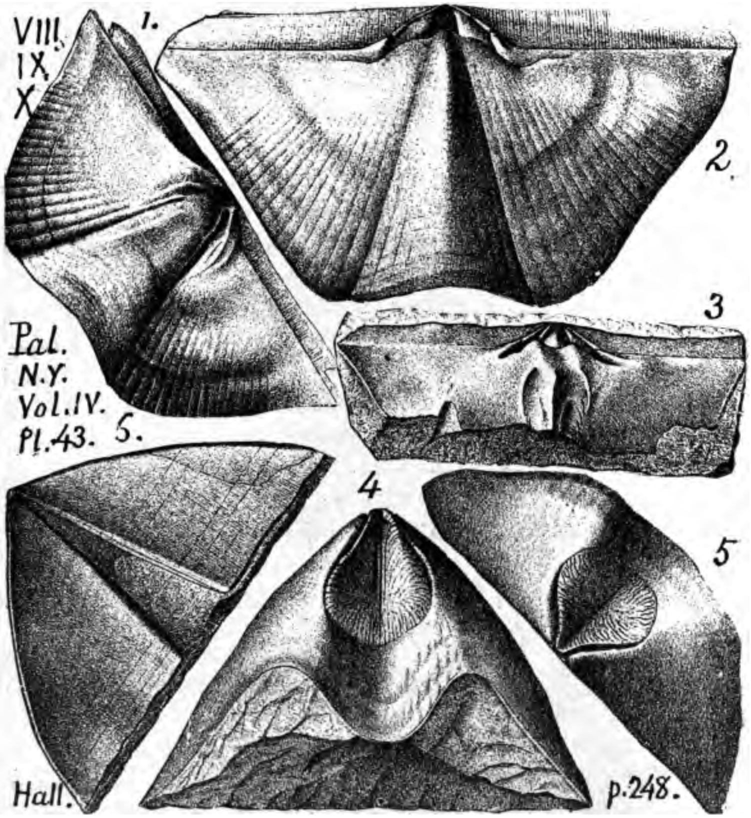
Spirangium corrugatum (*Palœoxyris*) Lesq. G. Sur. Ill. IV, 466, 1870. *Coal measures. XIII.*

Spec. 801–2, from Marshalls creek, Monroe Co.; 803–10, Orbisonia; 808–4, 808–6, Dingman's ferry, Pike Co., 809–3, Port Jervis, all from *Hamilton beds*. But Spec. 954–12 Tioga Co. is from *Upper Chemung*. — *VIII a, c; VIII g.*



Spirifera acuticostata, DeKoninck. Dawson's Acad. Geol. 1868, page 292, fig. 91, a Belgian shell, which may be identical with *S. cristata*, being also very abundant in the same N. Scotia *Carbonif. shell-limestone*, and always in company of that shell.

Spirifera alta, Hall. Pal. N. Y. Vol. 4, 1867, p. 248, pl. 43,

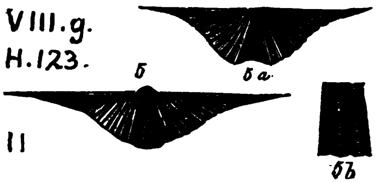


selected figs. 1, 2, casts of dorsal valves; 4, 5, two views of a ventral valve cast, showing scar and sinuate front outline; 3 hinge of ventral valve, showing cavities left by the removal of the dental laminæ, and the concave impression of the inner

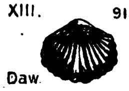
Spiraxis randalli. Newberry. See figure above, figs. 2, 3. Many specimens of this curious fossil have been submitted to Dr. Newberry from the *Chemung rocks* of southern New York and northern Pennsylvania, closely resembling *Spirangium quenstedti*, Schimper (*Palæoxyris*, Quenstedt, Hand. Pet. pl. 82, f. g) and *S. gilewi*, Romanowski (Geol. Turkestan) but with only two, instead of six, spiral raised lines. *Spirangium* moreover ranges from *Coal measures* up to *Wealden; Spiraxis* seems confined to the *Chemung*, [or, perhaps, lower *Pocono* (*Waverly*.)] At first looked upon by Brongniart (*Palæoxyris regularis*, Ann. Sc. Nat. Vol. 15) as the fruit of a plant like *Xyris*. Ettinghausen called it *Palæobromelia* (Abh. K. K. G. R. Vol. 1.) as if the fruit of some sort of *Bromelia*. Occurs only as sandstone casts, in rocks full of seaweed impressions (*Spirophyton*), but it seems not to have a stem, nor a frond of any kind. *Retepora archimedes*, so like it, is an animal (*bryozoon*.) *Dictyospongia* is also a simple cast, once considered a plant (*Dictyophyton*), now a sponge. *Hyalonema*, a sponge, shows a spiral tendency, and so does *Siphonocœlia*. Roemer *Stachyspongia* Zittell.) The cast is always composed of sand, sometimes with small quartz pebbles, probably introduced from one or both ends of the cavity left by the total decomposition of the soft organism, whatever it was. "It has been recently suggested by Schenck and Renault and Zeiller (Comptes Rendus, 17 Dec. 1888) that *Spiraxis*, *Fayolia*, *Spirangium*, *Palæoxyris*, *et id omne genus*, are the Eggs of Elasmobranch fishes." (Newberry, May, 1890.) Found by Dr. Randall near Warren, Pa. "in *Waverly* (*Pocono*) strata" (C. E. Beecher's paper on *Spirodomus insignis* in Hall's 39th An. Rt. N. Y. St. Mus. 1886, p. 161). — *X? VIII g*.

Spirifera acuminata, (*Delthyris acuminata*) Hall, page 270, f. 123, 5, 5a (internal casts) 5b, cast of outside magnified.) *Chemung VIIIg* (Conrad 1839, An. Rt. N. Y., *Corniferous*, and *Hamilton*.) —In Perry Co., Pa. Spec. 12,026 (weathered cast of interior) *Hamilton upper* shale; Spec. 12,228, and 12,352, (both poor,) *Ham. upper fossil ore.* Also (OOO, p. 235).

VIII.g.
H.123.

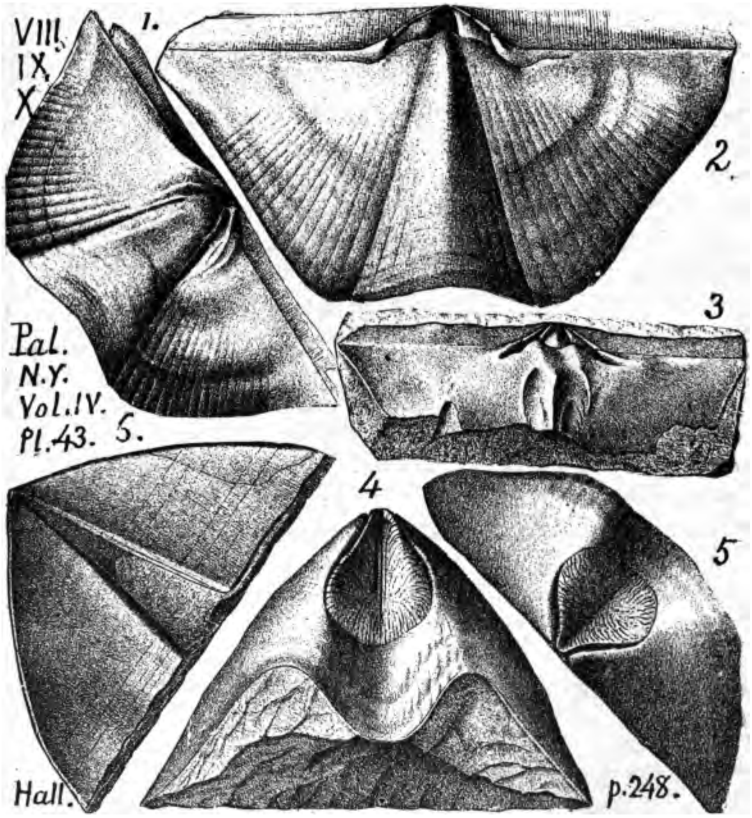


Spec. 801–2, from Marshalls creek, Monroe Co.; 803–10, Orbisonia; 808–4, 808–6, Dingman's ferry, Pike Co., 809–3, Port Jervis, all from *Hamilton beds*. But Spec. 954–12 Tioga Co. is from *Upper Chemung*. — *VIII a, c; VIII g.*



Spirifera acuticostata, DeKoninck. Dawson's Acad. Geol. 1868, page 292, fig. 91, a Belgian shell, which may be identical with *S. cristata*, being also very abundant in the same N. Scotia *Carbonif. shell-limestone*, and always in company of that shell.

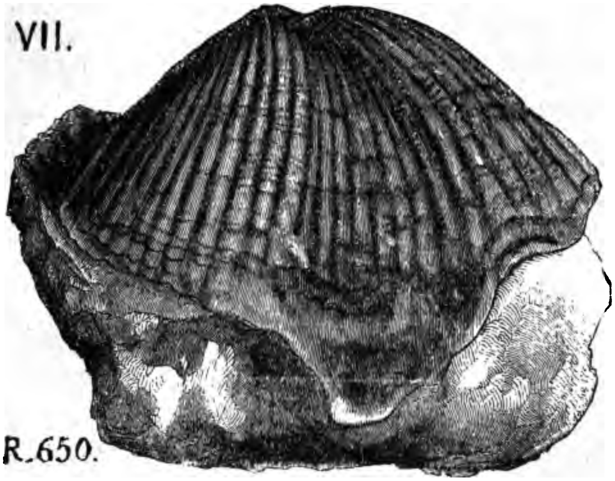
Spirifera alta, Hall. Pal. N. Y. Vol. 4, 1867, p. 248, pl. 43, selected figs. 1, 2, casts of dorsal valves; 4, 5, two views of a ventral valve cast, showing scar and sinuate front outline; 3 hinge of ventral valve, showing cavities left by the removal of the dental laminæ, and the concave impression of the inner



surface of the shelly plate which partially closed the foramen. Known to Hall, 1867, only as casts of the interior, much like *S. puscidata*, Martin, of Europe (but with important differences described on page 249), occurring in fine ferruginous sandstone (*Chemung*) at Meadville, Crawford Co., Pa., associated with *S. disjuncta*, *S. præmatura*, *Streptorhynchus chemungensis*, var. *pectinacea*, *Chonetes muricata*, *Productus* (*Productella*) *lachrymosa*, etc. — In Warren Co. Randall's Spec. 3333 (O, 149) from Robinson's farm, 2½ m. N. N. W. of Pleasantville. — A fine specimen collected by Hatch, near the Crawford line from near base of good exposure of *Corry sandstone* (*Second Mountain sand*) Q4, 93. *VIII*, *IX*, and *X*.

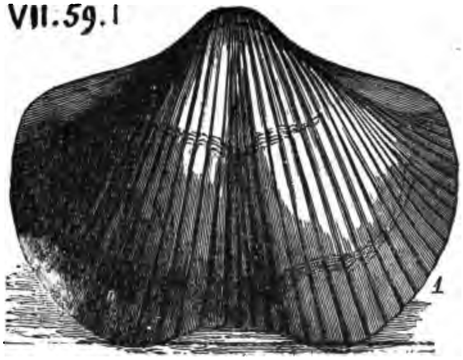
Spirifera arenosa. (*Delthyris arenosa*) Rogers, page 826, f. 650; Hall, Pal. N. Y. pages 148, 149, figs. 59, 1, 605, Vanuxem, pages 123, 124, figs. 28, 1, 29, 5. *Oriskany* (Conrad, 1839, An. Rt. p. 65.) — Spec. 801–6, Monroe Co., Pa. (G6, p. 123, 124, 248.) — In Montour district in *Sand block bed* (= *Stormville conglomerate ?*) under Oriskany. (G7, 95, 296); in *Oriskany* (G7. p. 86, 226, 230, 297, 305, 310, 329, Selinsgrove 346, 472.) — In Centre Co. T4, 431.) — In Huntingdon Co. in the Orbisonia neighborhood; Spec.

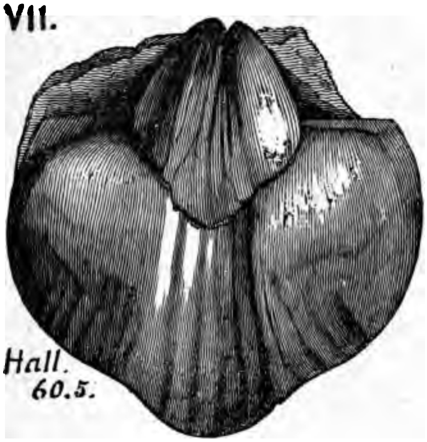
VII.



R.650.

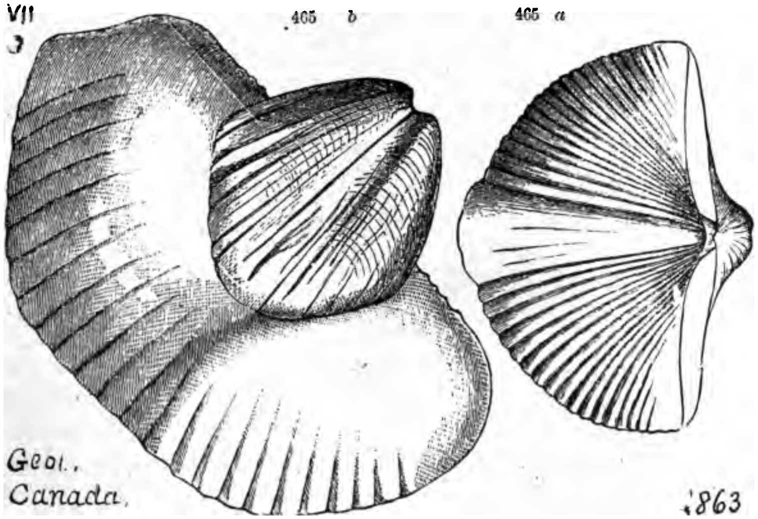
VII.59.1





701–5 (two); 701–10 (three); 701–11; 702–4 (four); 702–9; 702–15 (several on one slab); 702–17 (large); 702–18 large block with several fragments); 702–19; –20; 703–2; 703–5 (three); 703–6. Casts in top beds at Huntingdon car works and elsewhere. (T3, 119, 259.) — In Bedford Co., in bottom transition calc. beds No. 40, and higher up, bed No. 3 of Hyndman section (T2, 86, 104, 103); also Beegle's-Exline road (T2, 132); abundant, but not well preserved south of Bedford springs (T2, 148). *VII.*

Spirifera arenosa. Conrad Geol. Canada, page 960, fig.

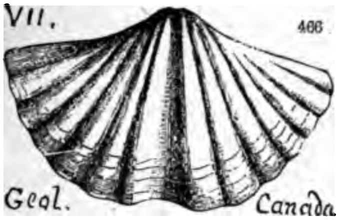


465 *a*, dorsal view; *b*, cast of interior of ventral valve. *Oriskany sandstone. VII.*

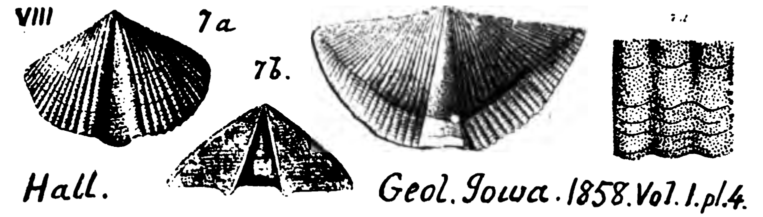
Spirifera arctisegmenta, Hall, 10th Report; Pal. N. Y. IV, *Upper Helderburg. VIII a.*

Spirifera argentaria, Meek, U. S. G. Sur. 40th Par. 1877. *Devonian.* (S. A. M.)

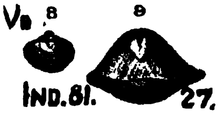
Spirifera arrecta, Hall. Geol. Pal. N. Y. Vol. 3, 1859, page —pl.fig.— Geology of Canada, page 960. fig. 466. ventral view of specimen from the Canadian *Oriskany sandstone.* — In Monroe Co., Pa. (G6, 111, 123). In Montour Co., (G7, 86, 297, 305 and eight specimens from Bloomsburg, Pa. 12,358, with valve as circular as S. *arenosa*; but scars all right.) — At Selinsgrove (G7, 346, and two specimens, 12,252). — In Perry Co. 12,109, 12,425, perhaps *S. arenosa,* Clark's mill, *Ham. SS.*— In Huntingdon Co., at Mapleton, Spec. 12,770 (small and poor); vast numbers in spots along Sand Ridge, below the middle of the formation (T3, 119, 274); also at Orbisonia and in the railroad cut at Three Springs (T,35; and specimens 701–3,–4,–12; 702–6; 703–7). — In Bedford Co., abundant at Bedford Springs; on the Exline road; and in bed 35 (50′ beneath the top of VII) at Hyndman on Wills creek (T2, 86, 103, 132, 148). — In Centre Co. (T4, 431.) — *VII.*



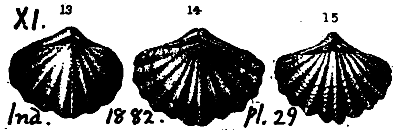
Spirifera aspera, Hall. Geology of Iowa, 1858, Vol. I, p. 508 pl. 4, figs. 7*a*, undersized ventral valve; *b*, its hinge, area, foramen (partially filled with the pseudodeltidium); *c*, large dorsal, with about 20 plications each side the middle fold; *d*, *enlarged*, grained surface, with a few distinct imbricating lines. The western representative of *S. macronotus* of the N. Y. *Hamilton;* closely like the Russian *S. tentaculum*, Mur. & De Ver. but without its plicated sinus. In calc. *Hamilton shale* in Iowa and Illinois. *VIII c* — In Erie Co., Pa., quoted by I. C. White, as characteristic of the *Third Oil Sand* (*Lebœuf*, or *Panama conglomerate*) Q4, 249, *Chemung-Catskill. VII–IX.*


VIII
7a
7b.
7 d
Hall.
Geol. Iowa. 1858. Vol. I. pl. 4.

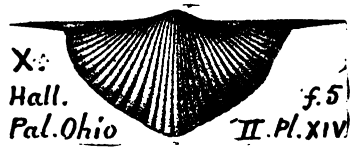
Spirifera belphegor, Clarke, Bull. 16, U. S. G. S. 1885, p. 30, plate 3, fig. 13, *magnified ten times*, ventral value, 14 to 16 distinct folds; casts show the hinge processes one-third the length of the shell; dorsal valve 10 to 12 folds, only *casts* have been found; both valves covered with finest ray lines; species not common, but the largest in the pyritous nodules of *Genesee black slate*, Ontario Co., N. Y. — *VIII e.*



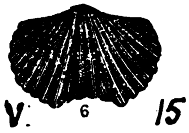
Spirifera bicostata ? *var.* petila, Hall, in Collett's Indiana Report of 1881, page 297, plate 27, fig. 8, 9.



Spirifera bifurcata. (Hall, Trans. Alb. Insti. Vol. 4, 1856. Whitfield Bull. 3, Am. Mus. Nat. Hist. 1882, plate 6, figs. 13, 14, 15). Collett's Indiana Rt. 1882, page 326, plate 29, figs. 13, *enlarged six times*, orginal specimen; fig. 14, a larger one, *enlarged three fold;* fig. 15, a still larger one, *enlarged twice*, from Spergen Hill. It may be identical with *Spirifera norwoodana*, found at the same horizon elsewhere. — *Subcarboniferous. XI.*

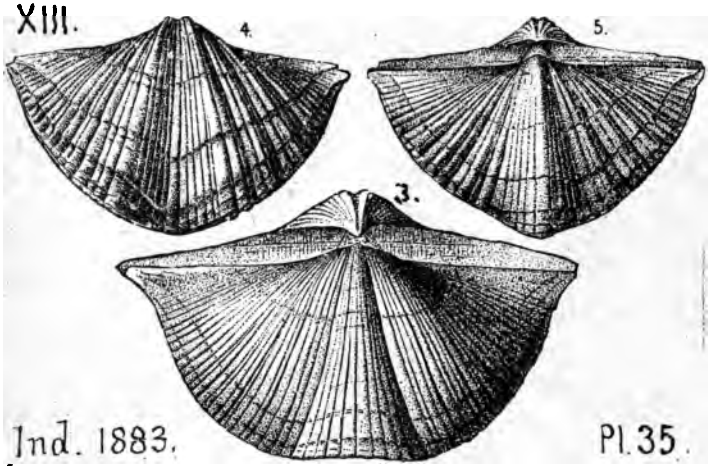


Spirifera (*Trigonotreta*) **biplicata,** Hall, Geol. Wisconsin, Vol. 1, part 2, 1858, *Kinderhook limestone.* (Compare *S. osagensis*, Swallow, Tr. St. Louis A. S. Vol. 1, 1860, p. 641.) — Pal. Ohio, Vol. 2, 1875, page 290, plate 14, fig. 5, dorsal valve, with the points *unusually* extended and sharp, and remarkably abrupt at the start. There are Ohio shells which seem to connect Hall's with Swallow's species. (Meek.) Richfield, O. *Waverly upper beds. X.*



Spirifera brachynota. Hall, Geology of the Fourth District of New York, 1843, page 70, fig. 5, 6. *Clinton formation. V a.*

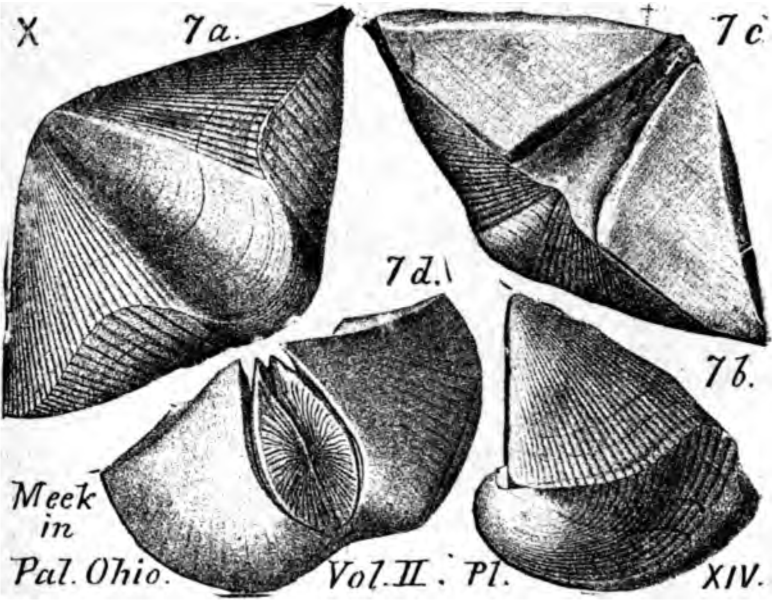
Spirifera camerata. (Morton, Amer. Jour. Science, Vol. 29, 1836, p. 150; White, Indiana Geol. Report for 1880, page 149, plate 8, fig. 3). Collett's Indiana Rt. of 1883, page 132, plate 35, fig. 3, *natural size;* ventral view of large specimen; figs. 4, 5, ventral and dorsal of another. One of the commonest species of American coal measure species, very characteristic, and ranging from top to bottom of the *Coal formation.* In Beaver Co., Pa., found by White in the *Trough run*, *Ferriferous*, *Brush creek*, and *Crinoidal limestones* (Q, 30, 34, 62, 152, 200; and K, 246). In Lawrence Co., in the *Mercer lower* and *Ferriferous limestones* (Q2, 46, 61, 78, 100, 106). — In Mercer Co. in the same (Q3, 25, 128). — In Fayette and Westmoreland Cos. abundant in the *Green crinoidal limestone* of the Pittsburgh series (K, 80; L, 35). *XIII*, *XIV*.



Spirifera cardiospermiformis, VonBuch. See **Spirifera decemplicata.** *V*, *b*.

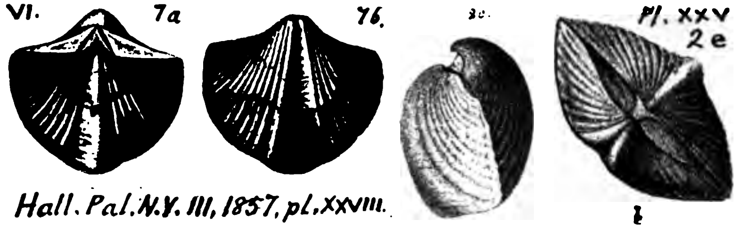
Spirifera carteri, Hall, 10th Regent's Rt. N. Y. 1857. *Waverly*, Pal. Ohio, Vol. 2, 1875, p. 285, plate 14, fig. 7 *a*, *b*, *c*, front, side, and hinge views, with some remains of the cast of the internal tube at *x*. Swallow's *S.* (*Cyrtia ?*) *hannibalensis* (Trans. St. Louis A. S. Vol. 1, 1860, p. 647) seems to be the same; and perhaps Hall's *S. capax*, and Winchell's *Syringothyris typus* and *Syr. halli*, may be mere varieties; all of them very near the English *S. cuspidatus*, Martin. When

Meek (Proc. A. N. S. Phila., Dec., 1865, p. 275) announced his discovery of the punctate structure and concordance with


X
7a.
7c
7d.
7b.
Meek in Pal. Ohio. Vol. II. Pl. XIV.

the internal character of *Syringothyris*, he predicted its discovery in those supposed to be non-punctate, and in some forms of *S. cuspidatus*. Soon after, he found Winchell's type specimens of *Syringothyris* to be punctate. King examined the English shells in question and concluded that all those *well preserved* showed the internal tube and punctate structure. (See his foot note to p. 288). — Licking Co. and Sciotoville, O.; also Michigan, Illinois and Wisconsin. *Waverly* (*Pocono*) *formation*. *X*. — In Erie Co., Pa., Carll reports it abundant in the *Third mountain sand* of Crawford Co., etc (IIII, 273). *X*.

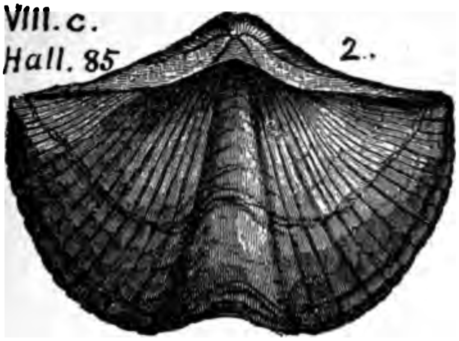
Spirifera concinna, Hall. Tenth Regent's Report, N. Y.

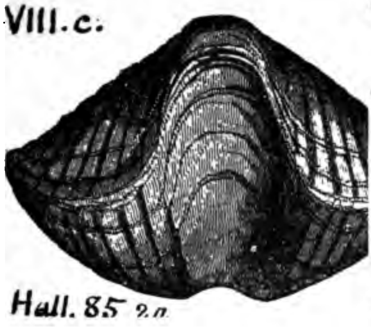

VI.
7a
7b.
3c.
Pl. XXV
2e
Hall. Pal. N.Y. III, 1857, pl. XXVIII.
I

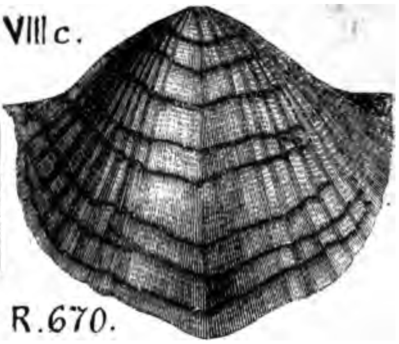
1857. Pal. N. Y. Vol. 3, 1859, page 200, plate 25, selected fig.

2 *a*, *b*, large specimen from shaley limestone, plate 28, figs. 7 *a*, *b*, dorsal and ventral valves of a large specimen from the *Upper Pentamerus* (*Lower Helderberg*) *formation* of New York. — In Pennsylvania recognized by Dr. Barrett in the *Stormville shales* of Monroe and Pike Cos. at Carpenter's Point on the Delaware. (G6, 132). *VI.*

Spirifera congesta (*Delthyris congesta.*) Hall page 207, figs. 85, 2, 2 a. Rogers, page 828, page 670. — See **Spirifera granulifera.** *Hamilton formation. VIII c.*

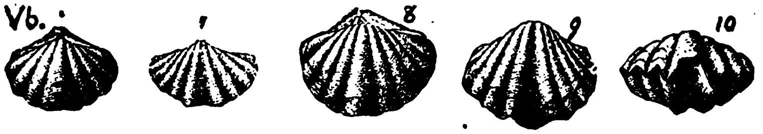


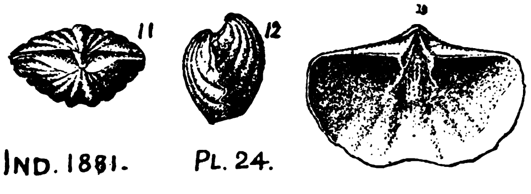




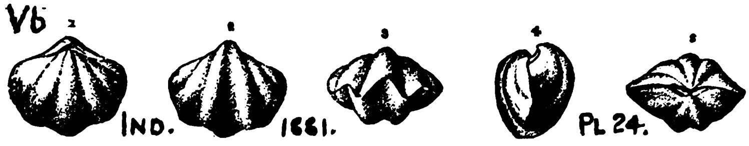
Spirifera crenistria, **Streptorhynchus crenistriatus.** *X.*

Spirifera crispa, Hisirgu. (*S. staminea?*) Fig. from Collett's Indiana Report of 1881, page 295, plate 24, figs. 6 to 12.

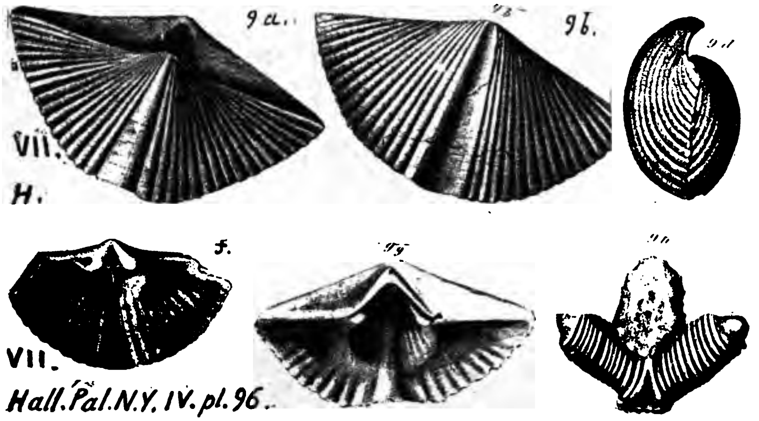




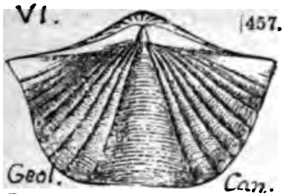
Spirifera crispa, *var.* **simplex**, Hall, in Collett's Indiana Rt. of 1881, page 296, plate 24, figs. 1–5.



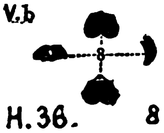
Spirifera cumberlandiæ, Hall. Tenth Regent's Report, N. Y., 1856; Pal. Foss. 1857; Pal. N. Y., Vol. 4, 1859, page 421, plate 96, figs. 9*a*, *b*, dorsal and ventral valves of a large specimen whose foramen is almost closed; *d*, profile; *f*, interior of dorsal valve, cardinal and crural processes, and dental fossets; *g*, interior of ventral valve, foramen partially closed, perforation at the summit, dental lamellæ, etc.; *h*, cast of spiral support to the breathing apparatus (probably of this species;) a shell of variable form and proportions; finer surface markings seldom preserved; shells in all stages of dissolution, and distorted by pressure in various ways so as to imitate different species. Found everywhere along the *Oriskany* outcrop in New York; and also at Cumberland, Md. In Bedford Co., Pa., Hyndman section on Wills creek (T2, 86); and abundant but not well preserved on the south side of Bedford Springs (T2, 148). In Huntingdon casts are found at the car works in the upper beds of the *Oriskany*. (T3, 259.) — *VII.*

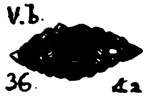


Spirifera cycloptera, Hall, Pal. N. Y., Vol. 3, 1859. —



Geology of Canada, 1863, page 960, fig. 457. *Lower Helderberg limestone.*—On the Delaware at Carpenter's Point, found by Dr. Barrett in the *Stormville shale* and *limestone* (G6, 132, 134.)—In Bedford Co., east of Lutheran church, Imlentown road (T2,156); abundant in Martin's ridge near Maryland line (p. 159.)—In Blair Co. at the quarries north of Tyrone City (OO, 234.)—*VI.*

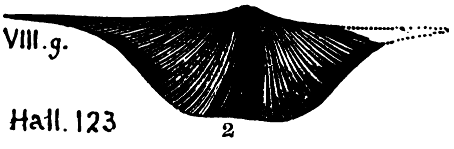




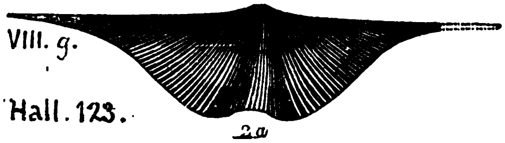
Spirifera decemplicata. (*Delthyris decemplicata ; Spirifera complicata; Spirifera sinuata.*) Hall, Geol. N. Y., 1843, page 105, figs. 36, 4, 36, 4*a* 36, 8. (Murchison, Silur. Research. 630, pl. 13, fig. 10.) *Niagara formation. Vb.*

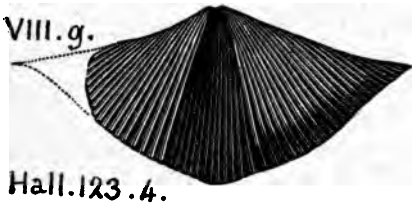
VIII.g.
Hall. 123. 1.

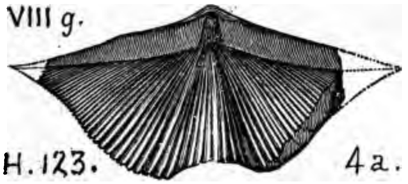
VIII.g.
VIII h.63
Hall.
122.3.

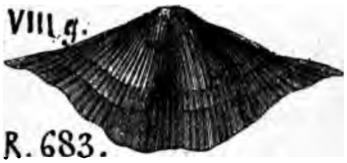


Spirifera disjuncta. (*Delthyris disjuncta. Delthyris inermis; Spirifera cuspidata,* Sowerby. *Spirifera acanthoptera,* Phillips.) Hall, pages 269,270; figs. 122, 1,2,2*a*, 3; figs. 123, 4, 4*a*, Rogers, page 829, fig. 683, 129; xxx, 129.) *Chemung.* (See Sowerby, in Trans. Geol. Soc. London, [2] Vol. V., 1840, and Phillips, Pal. Foss. XXIX, XXX, pp. 128, 129.)—Found everywhere in Pennsylvania, ranging from the









Hamilton up into the *Catskill formations. VIII c to IX.*

In the *Hamilton* it is found in Monroe Co., on Marshalls creek, near the falls, 865–2 (cast in iron ore); 865–3 (eight very poor specimens,) in Dewees' collections from Polecat Valley, Perry Co., bottom bench of *fossil ore bed* at the top of the *Hamilton sandstone*, *VIII c.* Spec. 801–3, 806–6, 807–4,–18,–19,–26,–39,–48,–49, –51; at Port Jervis, Del. and Hudson canal bank, 809–4; and at Orbisonia, Huntingdon Co. Saddleback ridge, 803–10,–22. *VIII c.*

In *Chemung deposits* it flourished most, every where. — In Monroe and Pike counties (G6, 105). — In Northumberland Co., in bed 4, and in great numbers in bed 6 of the Selinsgrove section (G7, 359) in *Lower Chemung.* — In Montour Co., in beds 13, 26, 30 and 36 of the Rupert section, and bed 72 of the Danville section (G7, 69, 286, 308) *Chemung.* — In Northumberland Co., in beds 8, 10, 14, 28 of the Fiedler's creek section (G7, 366) *Upper Chemung.* — In Wyoming Co., just above Skinner's Eddy, under the great quarry rock, a solid layer of coarse distorted Spirifers, much like *disjuncta*, probably representing the limestone at the *top of the Chemung* in the northern tier of counties (G7, 117). — In the *Stony Brook beds*, which on Fishing creek, lie 1872 feet above the *Genessee* and 400 feet beneath the lowest red bed of the *Chemung-Catskill* (G7, 68, 72, 197, 216, 227, 240, 277, 356, 365.) — In Bradford Co. near Leroy, Specs. 12,199, 12,210 (OOO, p. 145) in *Chemung.* — In Bradford Co. near Leroy, Spec. 12,210 (Cat. OOO); 12,981;

12,984 (impressions and casts). — In Tioga Co., Sherwood's collections, Spec. 801–1 (thirteen examples), –2 (numerous specimens and casts), –3, –4 a (cast) –6, –13, –18, –20, –21, –22 (impressions), –25 (large slab with many examples), –26, –31 (large slab with casts, hinge line very long), all from Lawrenceville. Also, 853 (six) from Tioga village. Also, 854–1 (cast), –2 (small handsome specimen covered with casts of small individuals), –6 (two casts, poor), –13 (shell partially exfoliated), –16 (very poor cast), –22 (small cast), –24 (hinge ends short and sharp), –27 (casts of both valves), –29 (casts of two dorsal valves, one showing muscular scar), –30 (hinge ends much extended, shell partially exfoliated), –38 (small), all from Charleston. Also, 856–5 (large slab showing a number of very long casts), –8 (several casts), –11 (six individuals), –12 long hinge, muscular scars), –13 (part casts), –14, –17 (several casts, showing scars), –21 (two), –38, –39, –52 (casts), all from Mixtown. Also, 860–9 (cast), –10 (*new species ?*), –13 (several casts on a slab), –53, –56, –58 (hinge line not extended), –81, –90 (two), all from Mansfield. Also, 861–40, from Sullivan, all from *Upper Chemung*. In Tioga Co., N. Y., at Nichols, collections of R. Howell, 872–8 (several casts and impressions), –9 (long form, impressions), –17 (two slabs), –18 (four slabs), –31, –32 (*a*), –37 (large slab covered with specimens, Randall's No. 9592), –38, –47 (*c* casts), 883–32, –34 (nine slabs), –39, –46 (very transverse form), 64 (*a*), –72, –75, –80 (*d*), 82 all in *Chemung*. — In McKean Co., 862–1 (twelve, several of them slabs with numerous casts) from DeGolier; 871–1 (?) 881–2 *a* from Bradford; 882–4 (?) from Kinzua creek; 3282 (O, p. 147) with *Orthis* and *Strept. chem.;* 3283, with *Rhyn.* and *Stroph. rhomb.* (?) in sandstone, Wilcox hill; 4388, 3389, with *Orthoceras*, 1 m. S. of Bradford; 3640, 3647, green flags, hill east of DeGolier; all in *Upper Chemung*. — In Cattaraugus Co., N. Y., 870–1 (ten specimens, mostly casts), –2 (a block with three good casts and several impressions), –3 three semi-circular specimens), –4, –6, –8 (twelve specimens, also nearly circular, and perhaps a different species), hilltop south of Salamanca, above the *Sal. conglomerate;* 871–1 (two slabs with numerous casts); 3, –4 *b*, from beneath the *Sal. con.* *Upper Chemung.* — Carll's Spec. 3394, found loose on Moses farm at limestone quarry, Cattaraugus Co., N. Y., is marked from the *Oil Group.*

In Warren Co. Randall's specs. 9529, 9530, 9536, 9537, 9589 (wrongly labelled *Avicula*), 9591, 9592, 9593, 9594; and 9531, on which *S. disjuncta*, and *S. mebocostalis*, may be seen together (G. B. Simpson, 1889), all in *Upper Chemung;* also, Carll's specs. 3.65, north of Wrightsville; 3373, east of Conewango; 3376, in limestone holding small quartz pebbles, Tidioute; 3378, in green calc. SS. south of Irvineton; all in the *Oil Sand formation*, whether this be the top of the *Chemung*, or *Catskill.* Carll reports it at three horizons of his Johnson saw mill Section (IIII, 255); well preserved specimens in the Hosmer run conglomerate (*First oil sand*, p. 250). His fine spec. 3281, with *Orthoceras* and *crinoids*, may be still higher. — In Erie Co. abundant in the *Panama* (*Leboeuf*) *conglomerate* (*Third Oil sand*) *Chemung ?* — In Erie Co. it is abundant in the upper division of the *Chemung*, as at Lathorp's quarry, N. E. township, with many other forms (Q4, 114, 298). In the *Third Oil sand* at Leboeuff's quarry were found Specs. 869-1 (poor casts), -4, -17*c*, -18 (peculiar looking cast), -22 (two). Also, abundant in a mass of shells *over* the Third Oil Sand (a broad winged species of this type) at the Carroll quarry (Q4, 240). Also scattered through the shales between the *Third* and *Second Oil sand* both in Erie and Venango Cos. (Q4, 104). Also in the *First Oil sand*, 2 m. above Sagertown, Crawford Co. (Q, 102, 198). — In Center Co. it is in the *Chemung* (T4, 434). In Huntingdon Co., it is very abundant (in the *Stony Brook beds* of G7, 250′ beneath the *Allegrippus* and 1100′ beneath the *Lackawaxon conglomerate*, on the south bank of the Juniata, *Upper Chemung*. (Spec. 12,851; T3, 193). 12,851. — In Bedford Co. it begins to be seen in the *Portage formation*, at three horizons, 1500′, 1200′, 1050′, beneath the *Allegrippus* (*lower Chemung*) *conglomerate* (T2, 80, 230). Then, in the *Chemung* at 425′ feet beneath the conglomerate, on Yellow creek (T2, 80). — In Perry Co. 12,987. *VIII g.*

The *Transition formation* from *Chemung* to *Catskill*, about a thousand feet thick in middle Pennsylvania, with the *Allegrippus conglomerate* at the bottom and the *Lackawaxon conglomerate* at the top, (called by Stevenson in Bedford Co., the *Lower* and *Upper Chemung conglomerates*, and perhaps corresponding to Carll's *Venango Oil Sand Group*, and to James

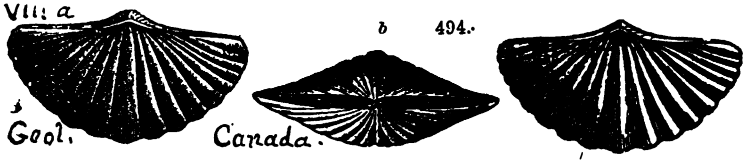
Hall's *Upper Chemung*) the *Spirifer disjuncta beds* are rather numerous. As, in Huntingdon Co. bed 7 at Haun's bridge 450′ to 500′ over the *Lack. Cong.* (T3, 98, 194); and on Weaver's and Coffee creek runs under the *L. C.* (T3,155); in large numbers also in the *L. C.* at Patterson (T3, 183.)— Also, in Bedford Co. at various places and horizons (T2, 133, 212, 214, 216, 225, 228) and in Fulton Co. (T2, 76, 290.)—In Perry Co. the *Kings mill sandstone* specs. 11,985 with *mesostrialis* 11,994, 12,063, 12,143, 12,442, 12,445, 12,446, 12,510, 12,515, 12,516, 12,523, 12,696, 12,880, 13,017 (small), 13,021 (poor), 13,024 (very small specimen 2400′ above base of Chemung), were got in various places at this horizon.—In Columbia and Montour Cos. *S. disjuncta* was found by White, in beds 10 and 36 at Rupert and Catawissa; G7, 64, 216, 238, 239, 270, etc.) — *VIII—IX.*

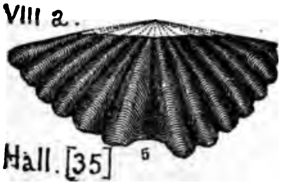
In the *Catskill formation S. disjuncta* appears to have contiued to live, being found in Columbia Co., in bed 31 of the Catawissa section (354′ above the lowest *fishbed* or 1375′ above the top of the *Chemung proper*, on Fishing creek), and at the bottom of the Catskill at Hartville, Luzerne Co. (G7, 57, 197, 238, 240; see Specs. 12,274, 12,331, 12,332, 12,335, 12,336 at Bloomsburg.)— See also, specs. 43 (twenty-five in number) from *Catskill* strata, 1 mile above Shermandale in Perry Co. —In Bedford Co., at Saxton (with *Orthis tioga?* above the *Upper* (*Lackawaxen* Conglomerate (T2, 78.) Also, 250′ above it at the end of Clear ridge, Smith's Valley, Huntingdon Co. (Spec. 5012) where it is abundant and characteristic of the *low Catskill iron ore bed.* (T, 26; T3, 102, 103). Also, 1005′ and 1045′ above the *Lack. Cong.* (that is 2400′ beneath the top of the great Catskill formation) on Coffee run, where it is numerous and in company of other indistinct forms and crinoids in olive shales. (T. 3, 89, 168.—In Warren and Venango Cos., it is found *over* the *Oil Sand Group*, in the *Bedford* and *Cleveland shales* of the Ohio system, and therefore in the *Catskill* (or *Pocono* perhaps) formation; Specs. 3309, 3333, 3351, with *S. alta. Orthis*, etc., both in sandstone and limestone. (O, p. 148 — 150.) In Southwestern Pennsylvania, it was found by Stevenson in the Conemaugh and Youghiogheny gaps, where however he does not recognize the existence of the Catskill formation.—*IX.*

In the *Pocono* (*Waverly*) *formation* in Crawford Co., Carll obtained fine specimens of it, from multitudes filling flagstones in the bed of Mill run at the Meadville oil well (Q4, 171.) Hundreds may be seen in the blue shale *under the Cassewago sandstone* at the canal feeder dam in Hayfield township (Q4, 94,201). This and many other Chemung shells are seen on the *Cussewago sandstone* at Meadville iron bridge (Q4, 165); and in flags, a mile west of Miller's railroad station, Rockdale (Q4, 223). It, or an allied species, is in fact the most common shell in the *Meadville Lower Limestone*, at Tidioute in Warren Co., (Q4, 88.) — X.

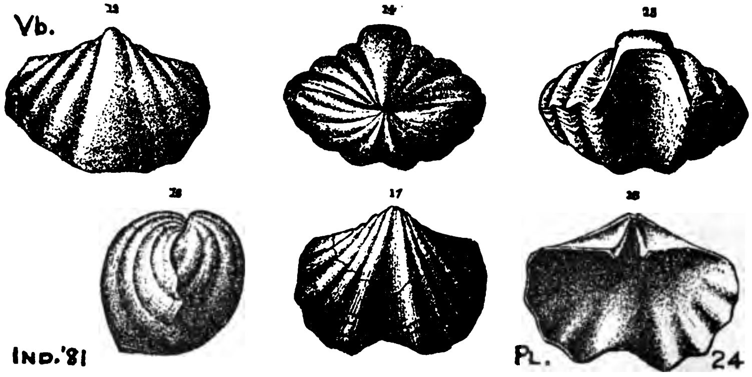
Spirifera divaricata, Hall, 10th. An. Rt. N. Y. St. Mus. 1857, Pal. N. Y., Vol. 4, *Cornif. limestone*, *VIIIa.* — In Penn., Monroe Co., Stroudsburg, White's coll. *Marcellus*, *VIII b.*

Spirifera duodenaria, Hall. Geol. 4th. District, N. Y., 1843, page 171. fig. 67.5, *Upper Helderberg.* Geology of Canada, 1863, page 372, fig. 394, *a*, dorsal valve; *b*, hinge line; *c*, dorsal view of another specimen. *Scoharie grit* and *Corniferous limestone.* *VIIb*, *VIII a.*





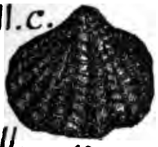
Spirifera eudora, Hall. Geol. Wisc. 1861; Trans. Alb. Inst.



1863; 20th Rpt. State Cab. 1867 and 1870; 28th Rpt. 1879; Collett's Indiana Report of 1881, page 294, plate 24, figs. 13 to 18; showing the same fine radiating striæ, as those on *S. macropleura* of the Lower Helderberg in N. Y. In casts the strongly incurved beak covers much of the area. Differs from Roemer's *S. niagarensis*, var. *oligoptycha* in longer hinge line; but does not differ essentially in any feature from the *S. macropleura* of Tennessee. — *Niagara formation. V b.*

Spirifera fimbriata (*Delthyris fimbriata*), Hall, Geol. of the Fourth District, N. Y., 1843, page 208, fig. 10, 10, *a*, cast of upper valve; 10, b, fragment magnified. *Hamilton.* (Conrad. Jour. Acad. Nat. Sci. Philada. 1842). Geol. Canada, 1863, p. 372, fig. 393, *a*, *b*, *c*, dorsal, side, ventral views. *Corniferous.* — Spec. 804–10, –13 (identified by J. Hall, Nov., 1888) 804–15, –18, –19 (J. H.), –22, –83 (J. H.); 806–5 (imp. of a bit), 806–10 (block containing impressions of this species, and *mucronata*, etc., all poor fragments); Spec. 807–24 (J. H.), –27, –32, –52 (? poor imp.), –60 (J. H.), all from Monroe Co., Pa., Marshall's creek. — Also, Spec. 808–10 (J. H.) from Dingman's Falls, Pike Co., Pa. All the above from *Hamilton strata.*

VIII.c.

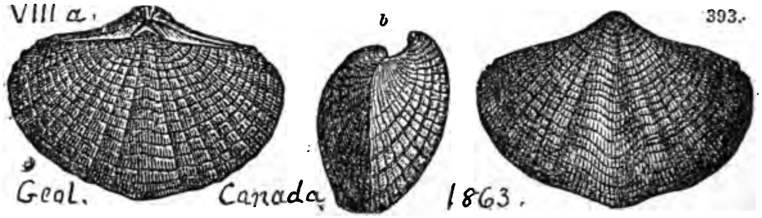


Hall. 8b.

10

10 *a*

10 b

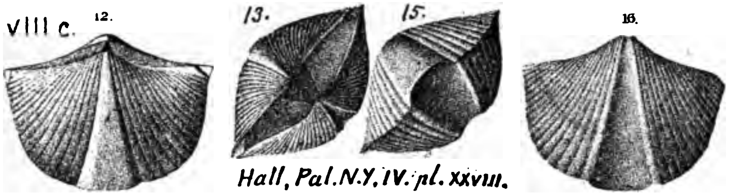


VIII a.
b
393.
Geol. Canada 1863.

VIII c. — Spec. 810–3, –12, from Hogback, road to Shawnee. Monroe Co., Pa. *Upper Helderberg. VIII a.* — Also I. C. White's collections half a mile north of Stroudsburg, OOO, spec. 12,592 (with *Modiomorpha concentrica*, and *Leiorhynchus multicosta*); 12,565 (impressions, with corals); 12,601; 12,606; 12,607 (with *Actinopteria decussata*) all from *Marcellus. VIII b.* — In Columbia Co., Catawissa, Tully limestone (G7, 289). *VIII d.* — Also, Spec. 12,189, 12,308, Bloomsburg, *Hamilton upper slates. VIII c.* — Montour Co., South

Danville, 100′ under top, and also at the top of *Hamilton proper* (G7, 229, 352). — Perry Co., various places, specs. 11,679 (a cast); 12,189 (poor); 12,222 (poor impression); 12,382; 12,410; 12,496 (with fragm. of *Fenestella*), 12,502; all from *Hamilton upper shales.* — Huntingdon Co., 12,787, the same. *VIII c.*

Spirifera formosa, Hall. Tenth Regent's Report, 1857;

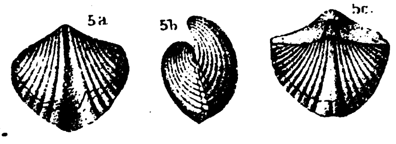


Hall, Pal. N.Y. IV. pl. XXVIII.

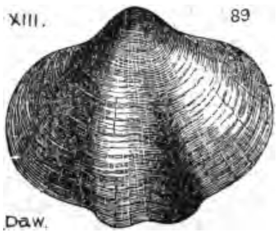
Pal. N. Y. Vol. 4, page 220, plate 28, fig. 12, 13, 15, 16, dorsal, cardinal, front and ventral views of a typical specimen from a limestone in Illinois of *Hamilton age ;* 15 to 17 slender rounded plications on each side, crossed by fine concentric wavy striæ, often with extremely fine radiating striæ. — Perry Co., Pa., doubtfully identified in Spec. 12,708 (poor) from gap in Little mountain, 2 m. from Sterritt's gap. *Hamilton sandstone. VIII c.*

Spirifera fultonensis, Worthen. Geol. Sur. Ill., Vol. 5. 1873, page 572, plate 25, figs. 5 *a*, *b*, *c*, three views of a unique little shell found in the limestone bed outcropping over a *low coal bed* of Fulton Co., Ill. Surface ornamented with 16 to 20 smoothly rounded plications on each valve, nearly twice the width of the spaces between them. *XIII.*

XIII. Geol. Illin. Vol. V. Pl. XXV.

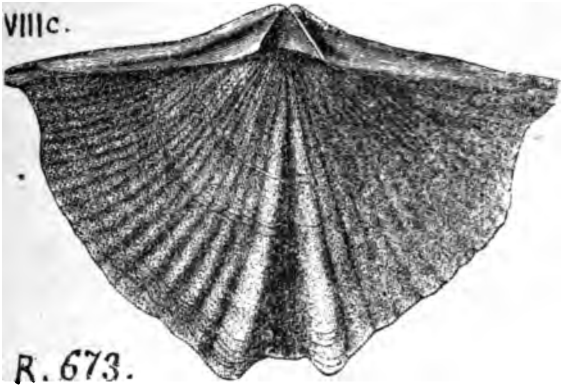


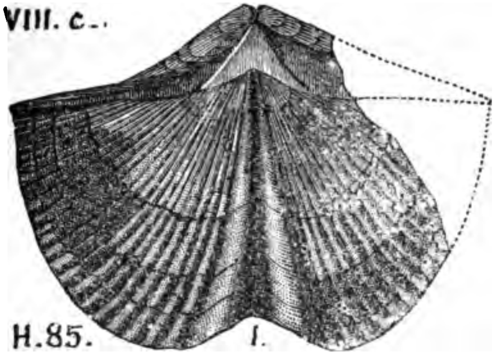
Spirifera glabra, Martin. Dawson's Acadian Geology, 1868, page 291, fig. 80, a common fossil shell in the *Lower Carboniferous limestone* of Nova Scotia, identical with the British species; one of Lyell's specimens is 13 lines long by 17 broad. *XI?*

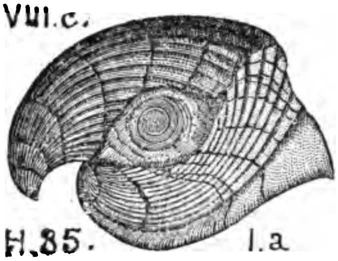


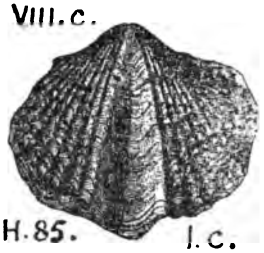
Spirifera glanscerasi, White. 1862. *VIII c.*

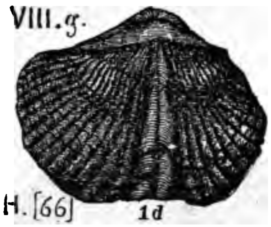
Spirifera granulifera (*Delthyris granulifera*). See **Spirifera congesta.** Rogers. Page 822, fig. 673. Hall, page 207, fig. 85, 1; 85, 1a, end view showing the internal spiral coil; 1b, the long hinge; 1c, and 1d, younger individuals. *Hamilton.*—In Monroe Co., at Stroudsburg, Spec. 12,605, (cast); at Marshall's falls, in *Hamilton sandstone* (G.6, 111, 230, 255; specs. 801–2,–3; 806–6; 807–26–48, all identified by James Hall, 1888.) —Pike Co., Dingman's Falls, Spec. 808–4,–6 (improperly labelled *S. acuminata*, (J. H.) Also, Port Jervis, D. & H. canal, Spec. 809–3 (ditto.)—Tioga Co., Spec. 854–12.—Columbia Co. Little Fishing creek, (G7, 75, 79);






VIII. c.
H. 85.
1. a


VIII. c.
H. 85.
1. c.



Bloomsburg, Vanderslice's quarry, Spec. 12,308 (impression of exterior); Catawissa, 100′ below top of *Hamilton* (G7, 229, 289); Montour Co., Danville, top of *Hamilton*, (G7, 352, 289); Northumberland Co., Paxinos station (p. 354); Selinsgrove 12,257, top of *Selin. U. Hamilton sandstone* (pp. 79, 359.)—In Perry Co., at Barnett's mills, and Marysville, Specs. 11,771 (crushed); 12,700, 12,831 (mostly casts, one shows granules very well); 12,832 (fair exteriors), 13,009 (poor); 13,012 (weathered cast.) *U. Ham. slates.*—In Huntingdon Co., numerous in *Ham. lower shales*, just over *Marcellus*, Goodman's near Huntingdon, and at Coffee run (T3, 171, 258); in *Ham. lower sandstone*, 700′ above *Oriskany*, Shy Beaver run, and also Weaver's run (T3, 156, 163); *Ham. middle shales*, bottom beds, Cove Station long cut, and also along Murray's run. (T3, *111*, 261); in *Ham. upper sandstone*, 355′ below *Genesee*, Coffee run section, and also end of Jacks mountain (T3, *III*, 169). Also, Spec. 803–22 (verified by J. H.) in Saddleback ridge near Orbisonia.—Also 12,861 (distorted and broken).— *VIII c.*

S. granulosa, Conrad. 1839. *VI.*

Spirifera gregaria, Hall. Tenth Report 1857.—Geol. Canada. 1863, page 372, fig. 391 *a*, *b*, *c*, three views of a specimen from the *Corniferous limestone. VIII a.*

S. grieri, Hall. Pal. N. Y. IV—*VIII b*, *VIII a.*

Spirifera hamiltonensis.—In Monroe Co., Pa., reported by I. C. White to be numerous (with *S. granulifera*) in the bed of Marshall's creek, at its rapids, half a mile above the township line, over *Hamilton sandstone.* (G6, 280.) — *VIII c.*

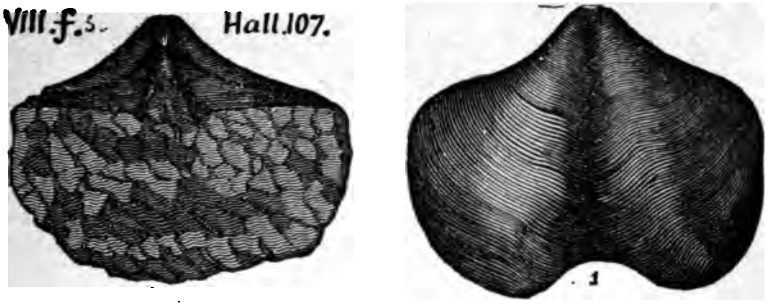
Spirifera hemiplicata. **Syntrielasma hemiplicatum,** *XIII.*

Spirifera kentuckensis. **Spiriferina kentuckensis.** *XIII.*

S. grimesi; guadaloupensis; hannibalensis; hemicycla; hirtus; hungerfordi; huronensis; imbrex; incerta; increbescens; inæquicostata; insolita; inutilis;

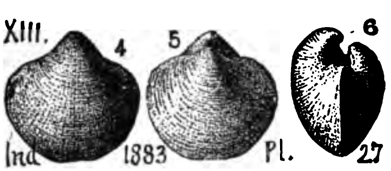
iowensis; kennicotti; keokuk; lævigata — are western species not yet recognized in Pennsylvania.

Spirifera lævis (*Delthyris lævis,*). Hall, Geology of the Fourth District of New York, 1843, page 245. fig. 107, 1, 1a., *Portage formation. VIII f.*

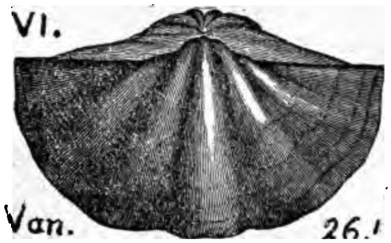


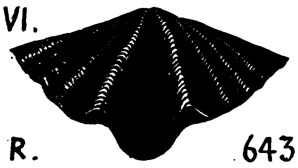
Spirifera leidyi, Norwood and Pratten. Jour. Acad. Nat. Sci. Philad. [2] Vol. 3, 1854, *Chester limestone.* (Varieties: *S. l. chesterensis*, Swallow, Trans. St. Louis Acad. Vol. 2, 1866, *Chester limestone;* and *S. l. merrimacensis*, ditto, *Warsaw limestone*). — In S. W. Pennsylvania recognized by Stevenson in *Subcarboniferous strata* in the gaps. (K3, 311.) *XI.*

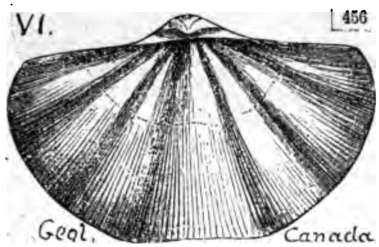
Spirifera ligus. See **S. pinnata.** *VIII c.*



Spirifera (*Martinia*) **lineata,** Martin. (European species, perhaps identical with McChesney's *Spirifera perplexa*, but not certainly). Collett's Indiana Report of 1883, page 133, plate 27, figs. 4, 5, 6, ventral, dorsal and lateral views of a medium sized specimen, *natural size.* Collected from at least eleven counties in Indiana. — In S. W. Pa. Stevenson's list of *Coal measure* fossils (K3, 309). — Found by White, in the Beaver Co. *Ferriferous limestone* quarries, S. bank of Ohio (K, 346), and on Whistler's run (Q62, 193). — In Lawrence Co., in the *Mercer lower and upper limestones* (in *XII*); and in the *Ferr. L.* (Q2, 46, 57, 61, 106). — In Mercer Co., in *Ferr. L.* (Q3, 25). — In the Northern Anthracite Field, doubtfully recognized by Heilprin among the shells in the Wyoming Hist. Soc. Cab. (An. Rt. 1885, p. 453). *XII, XIII.*

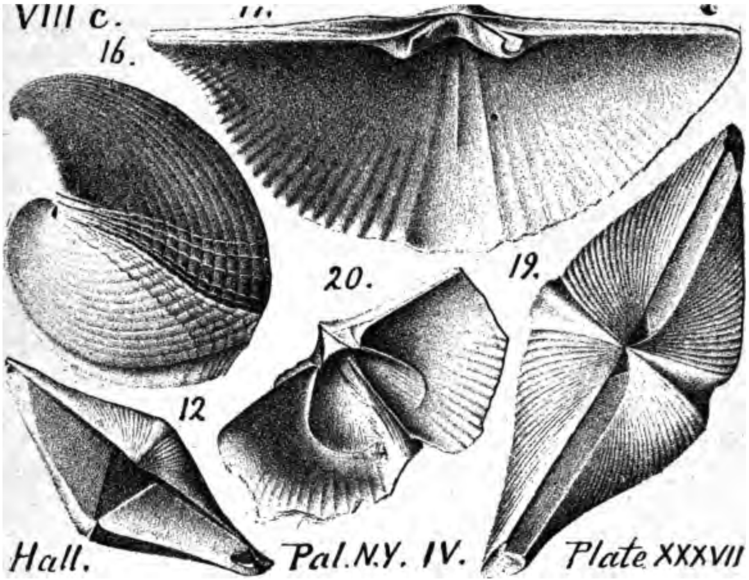






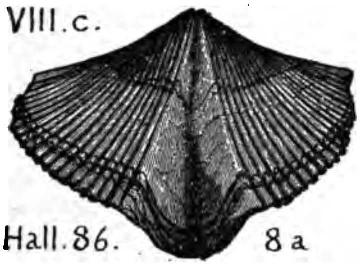
Spirifera macropleura. (*Delthyris macropleura*, Conrad. Annual Report, N. Y. 1840). Vanuxem, Geol. Third District, 1843, fig. 26, 1. Rogers, Geol. Pa. 1858, fig. 643. Logan, Geol. Canada, 1863, fig. 456. *Lower Helderberg.*—In Pennsylvania, Pike Co. Spec. 606–10, road to Shawnee, Walpack bend; 608–6 (identified by J. Hall, 1888), Bushkill; in *Stormville shales* just under the *Oriskany*, quite abundant near top of the beds, in Monroe Co.; also in the *Stormville limestone* lower down at Port Jervis. (G6, 123, 131, 134, 245, 279).—In Montour and Columbia Cos. it and *Stroph. depressa*, are the two commonest shells in the *Stormville shales* only; but in Northumberland Co. it occurs also in the *Oriskany* (G7, 94, 101, 298, 346, 375). In Perry Co. Claypole found it at various outcrops of the *Chert beds* (under the *Oriskany*), Specimens 11,828, 12,709, 12,801, 12,803, 12,806 (one of the two misnamed *S. octocostata;* the other indefinable).—Rogers' fig. is from a specimen in Huntingdon Co. in Aughwick Valley. *VI.*

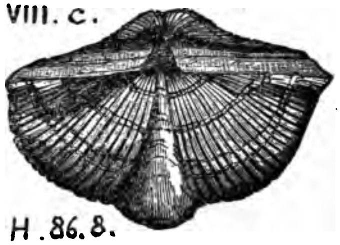
Spirifera marcyi, Hall. Tenth Regent's Report, N. Y. 1857. Hall, Pal. N. Y. Vol. 4, page 226, plate 37, selected from figs. 10 to 20. Fig. 12 hinge view of a small individual; 16, profile of an unsymmetrical one, with a very round dorsal valve; 17, interior of a dorsal valve showing cardinal process and dental sockets; 19, hinge view of one less gibbous; interior of broken ventral valve, showing the broad muscular scar. Found in many parts of New York in the *Hamilton strata.*—In Pennsylvania, Spec. 805–2 (verified by James Hall, Nov. 1888) was got ½ m. north of Marshall's Falls, in Monroe Co. from *Hamilton shale. VIII. c.—For the figures see page 1017.*

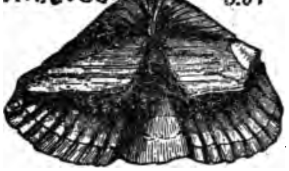

VIII c.
16.
20.
19.
12
Hall. Pal.N.Y. IV. Plate XXXVII

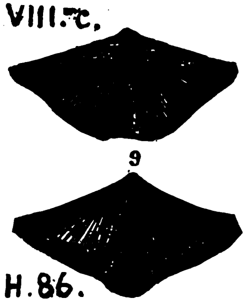
Spirifera medialis. (**Spirifera audacula**, Conrad. Correction of p. 192 above by R. P. Whitfield, Feb., 1889).

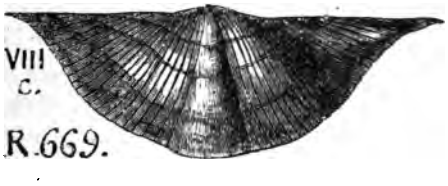
Spirifera medialis (*Delthyris medialis*, Hall, Geol. N. Y.,


VIII.c.
Hall.86.
8 a

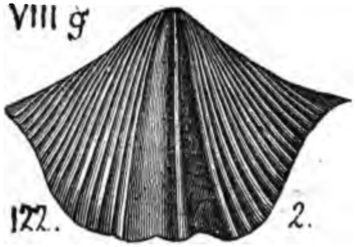








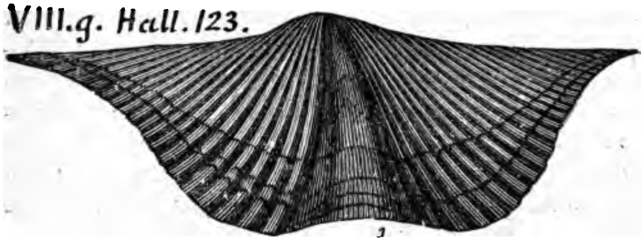
1843, figs. 86, 8, *a*, *b*, 9a (a young one). Rogers, Geol. Pa. 1858, fig. 669. (Variety *S. eatoni*, Hall, 10th An. Rt. 1857). — In Monroe Co. Marshall's Falls, Spec. 801–1 (identified by J. Hall, 1888); at Stroudsburg, 12,594. — In Montour Co. found 100′ beneath the top of the *Hamilton* (G7, 75, 229). — In Perry Co. at Barnett's mills; Rattlesnake hill; Crawley hill; Dorran's narrows (Specs. 11,677; 12,025 (five interior casts); 12,029; 12,347, mostly casts, but some showing structure well, in the high fossil ore; 12,538, 12,543, cast), all in *Hamilton upper shales;* and on Pisgah hill; at Baileyburg; on Crawley hill; and at Rambo's, Specs. 12,117 (pair of dorsal valves); 12,229; 12,277, two; 12,462, four, one a cast; and 12,467, three, all in the *Hamilton sandstone.* — In Huntingdon Co. it occurs at various horizons. At Summer's (Spec. 12,857, poor), in *Marcellus* [?] At Goodman's near Huntingdon, just *over* the *Marcellus*, numerous in the *bottom Hamilton beds* (T3, 258); at Weavers seen in *Hamilton lower sandstone* (T3, 156); at Cove Station in *Ham. mid. shale* (T3, 111); and in bed 22 of Patterson section in *Ham. upper shale* (T3, 186); at Rough and Ready, Spec. 12,745, in the same. But the species goes much higher to the *Stony Brook beds* (near top of *Chemung proper*) in Columbia Co. at Rupert, Stony Brook, Fishing creek (G7, 68, 72, 197, 216); and is quoted by C. E. Hall as among Randall's collections at Warren Co. — Also 12,873, 13,008, 13,011. — *VIII b*, *c*, *g*,

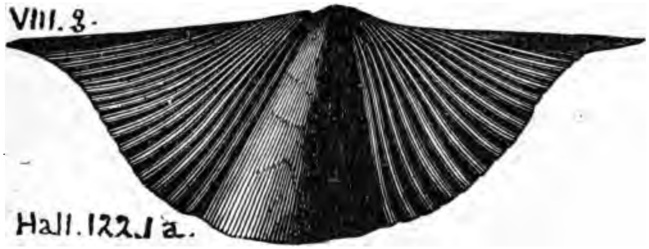


Spirifera mesocostalis, (*Delthyris mesocostalis; Delthyris acuminata.*) Hall, Geol. N. Y., page 269, fig. 122, 2. *Chemung.* (Meaning. "with folds in the middle depression.") — In Pennsylvania, Huntingdon Co. it is very abundant in the Haun's bridge section, 275′, 300′, 450′, and 475′ beneath the *Chemung upper* (*Laxawaxen*) *conglomerate* (T3, 98, 194); and in the Juniata river section (T4, 193, 264) equally abundant in a very fossiliferous bed 1200′ beneath it, — i. e. 250′ beneath the *lower*, or *Allegrippus conglomerate*, in what corresponds to the *Stony Brook beds* of the Montour region; also it occurs at Rupert, Danville, and

Selinsgrove, 180′ above the *Genesee;* i. e. in the lowest, lower and higher *Chemung* (G7, 69, 72, 289, 290, 308, 359.) — In Center Co. (T4, 434). — In Warren Co. Carll's collections. — In Erie Co., abundant in White's *Upper Chemung* (Q4, 118.) — Specimens are in the cabinet from Monroe Co. 801-5, 806-2, 807-27; and Pike Co., 808-48 (three), 810-12, all from *Hamilton strata.* — From Huntingdon Co., Orbisonia, 803-24, 804-10, -13 (a tray full), -15, -17, -18, -19 (seven), -22, -43, -50-(four), -59, -(casts), -60, -69 (two,) -81, -83, -87, all from *Hamilton strata.*— From Tioga Co., 854-8 (poor, casts of both valves, -9 (fair casts), -21*c* (three, one fairly good showing rib in mesial fold composed of three equal plications), -32 (dorsal cast); 855-39 (fair ventral cast); 856-1 (cast), -2, -10 (casts); 11*b* (two good casts), -20 (one impress, one dorsal cast), -27; 858-9, -16; 860-2*b*, -11, -17, -32, -44*c*, -56*c*, -64, -69, -72 (identified by J. Hall, Dec., 1888); 861-21 *d*, -25, -28, -31, -39, all from *Upper Chemung.* — From Tioga Co. N. Y. Nichols, 872-8, 88, -89; 883-64, -82*d*, -85, -90 (five), -92, all from *Chemung.* — From Erie Co. 869-13, from a Leboeuff quarry in *Panama conglomerate (Third Oil Sand) highest Chemung strata.* — *VIII c; VIII f; VIII g.*— Specimens in OOO examined by G. B. Simpson; 11,876 from Newport, Perry Co., several slabs containing it in numbers, varying in form (perhaps specifically); some of them would be pronounced *S. mucronata* if that species ever extended up into the *Chemung*; 11,879, good specimens, varying much, with very plain radiations along the plications, fold and sinus. *Chemung-Catskill. VIII g —IX.* 11,925 (poor) and 11,933 (shell with its impression) from 2½ miles N. of Liverpool. *Chemung. VIII g.*—11,988, Perry Co., (mostly interior impressions); 12,008 (?); 12,032 12,036 (poor), all *Chemung.*—12,043 (with *Cyrtina hamiltonensis*) at Junkin's farm; 12,057 (ditto); 12,059 (marked *Productella*, but it is a mass of *S. mesacostalis*); 12,060 (some fine specimens, with *Leiorhynchus* and *Cyrtina hamiltonensis*); 12,062 (a mass of *S. mesocostalis* with a few fragments of *Lemoptera macroptera*); all the above from *Chemung-Catskill, VIII g-IX.* — Bloomsburg, 12,158 (some with deep sinus); 12,183 (12 casts, some showing the structure better than any in the collection) *Hamilton, VIII c.* — Leroy, Bradford Co. 12,194 (casts, poor,); 12,202 (slab, a mass of broken casts).—

Bloomsburg, 12,265 (with *Gram nysia communis?*) *Catskill, IX.*—Perry Co., Montebello, 12,573 (concentric lines very prominent, presenting an imbricating appearance as they cross the plications.) *VIII g.* — Huntingdon Co., 12,847 (with *Ambocoelia umbonata, etc.*, 1650′ below *IX.*)—Northumberland Co., 12,877, *King's mill S.S. IX.*— Bradford, Leroy, 12,988 (good); 13,018 (good); 13,023 (good).—Perry Co., 13,034 (large slab, many good specimens.) *Chemung. VIII g.*




VIII.g.
Hall.122.1 a.

Spirifera mesostrialis (*Delthyris mesostrialis*), Hall, Geol. N. Y., 1843, page 269, figs. 122, 1,1a. *Chemung.* (meaning: "with fine lines, or striæ in the middle depression.") In Pennsylvania this shell is found at various heights in 2300′ of *Portage* and *Chemung strata* in the Rupert section, Columbia Co. (G7, 69); in bed 38 (125 feet thick, with *S. mesocostalis*, 580′ above the *Genessee*), bed 36 (100 feet higher, with *S. disjuncta*), bed 9 (1900 feet above the *Genessee*); and abundantly in another section on the river below Rupert, in beds 12 and 9 (1580′ and 1950′ above the *Genessee*) corresponding to the *Stony Brook beds* on Fishing creek (G7, p. 64, 68, 69, 240). At Catawissa, however, it is found in great abundance and with *S. disjuncta*, in a thin layer (bed 31, G7, 57,=bed 22, G7, 240) 1750′ above the top of the *Chemung*, and 375′ above the top of *Chemung-Catskill passage beds*, marked by the *Holoptychius fish-bed.* — Between Catawissa and Bloomsburg it is seen in *Chemung* bed 59 (G7, 286); on Fidler's creek, North. Co., bed

18 and 28, both *Upper Chemung*, Specs. 12,155 (three); 12,180; 12,183 (12) from Bloomsburg. — In Bradford, near Leroy, in *Upper Chemung*, Specs. 12,194 (four); 12,203 (three); 12,211 (with a fish-plate). — From H. S. Williams in Claypole's coll. Spec. 12,471 (two type forms). — In Perry Co. Specs. 11,876 (2), 11,879 (4), 11,029 (4), 12,005 (7), 12,012, 12,219, all from the *Chemung;* 11,871 (9), top of Newport hill, from *Chemung-Catskill;* 11,898 (2), King's mill, SS. *Catskill strata.* — In Bedford Co. Stevenson finds an indistinct shell " near to *mesostrialis*" in bed 41 of the Saxton section (T2, 231) 1800′ beneath the *Chemung lower* (*Allegrippus*) conglomerate, and therefore in the *Portage formation;* also near Suttons, Napier township, in the *Allegrippus* itself (T2, 117). — C. E. Hall reports specimens among Carll's collections from the oil region; and (doubtfully, and with *Lingula tigea*) in *Berea grit*, from the Gibson well near Jamestown, Crawford Co., Spec. 3299 (O, 148). This would carry the species up beyond the Catskill into the *Pocono* (*Waverly*) *formation!* — NOTE. Respecting this and two preceding species see Preface to G7. — *VIII f; VIII g; VIII-IX; IX; X?* — Notes by G. B. Simpson: 11,871, some fair specimens showing the characteristic fine lines in the mesial depression; 11,898, large blocks with numerous individuals; 11,904; 11,929, poor; 12,005, unusually large specimens; 12,012, poor impression; 12,155, poor; 12,170, fragments, with *St. perplana*, var. *nervosa*, and *Ac. birostrata;* 12,180, a small specimen of rock, a mere mass of this species; 12,181, blocks with surfaces covered with *S. mes.* and a few *Cyrtina hamiltonensis;* 12,184, ditto; 12,331.

Spirifera modesta, Hall. Pal. N. Y. Vol. 3, 1859, page 203,

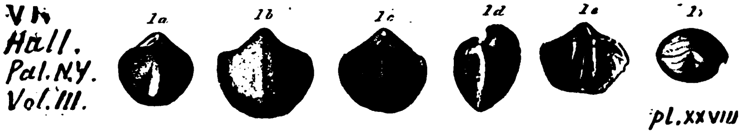
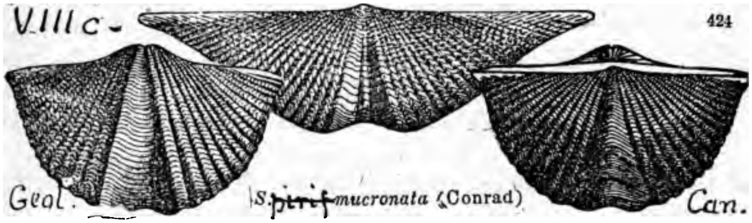


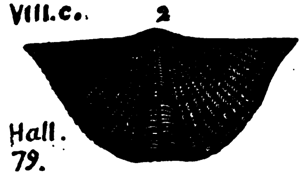
plate 28, figs. 1 *a*, dorsal view, ordinary size; *b*, *c*, *d*, larger ventral, dorsal and profile; *e*, ventral interior; *f*, front view of *a*. Surface, faint concentric lines of growth. Has a much higher area than the similar *Nucleospira ventricosa* of L. Held. shaley limestone. More like the Carboniferous *S. lineata*, but surface different and foramen narrower. Cumberland, Md., in

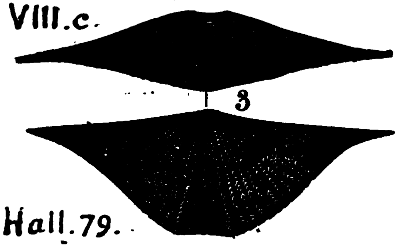
Lower Helderberg limestone. — Found by Dr. Barrett at Port Jervis on the Delaware, in White's *Stormville limestone.* *VI.*

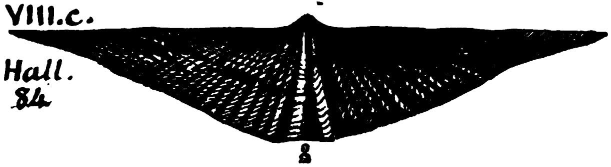
Spirifera (*Delthyris*) **mucronata,** Conrad. Ann. Report

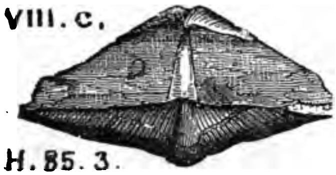


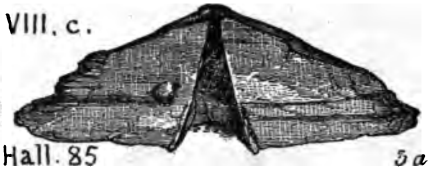
N. Y. 1841. *Marcellus* and *Hamilton.* Geol. Canada, 1863, page 386, fig. 424 *a*, long winged variety; *b*, *c*, short winged variety. *Hamilton.*—Hall, Geol. N. Y. p. 198, f. 79, 2, 79, 3.

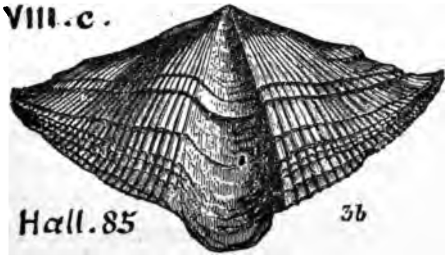


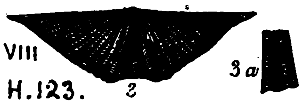

VIII.c.
3
Hall.79.



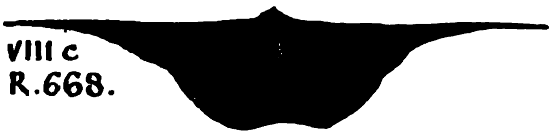






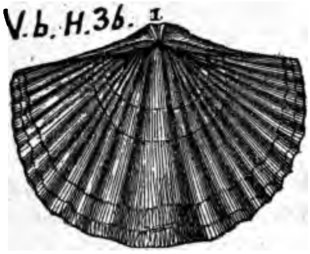


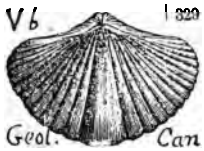
Hall, page 205, figs. 84, 3. Hall, page 207, figs. 84, 3, 3 a (area of lower valve), 3b (lower valve).



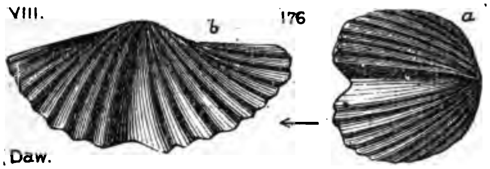
Hamilton (Conrad, page 54, 1841). — Hall, page 270, fig. 123, 3, in *Chemung*. — Rogers, page 828, fig. 668. — Vanuxem, page 150, fig. 36, 3. ***Marcellus***. — In Pennsylvania it is essentially a ***Hamilton*** **fossil**, except in the north where it is in *Upper* (?) ***Chemung***. — In Pike Co. on the Delaware, at the *top of the Hamilton* (G6, 194). — In Monroe Co. Marshall's falls, ***Hamilton sandstone*** (Spec. 807–36, –37, –50, –58, –59, –61). — In Columbia Co., Big Fishing creek, *base of Hamilton* (G7, 219); also 250′ and 100′ below *top* (G7, 75, 79, 208, 229). — In Northumberland Co. (G7, 354, 359). — In Lycoming Co., Muncy, Hamilton flags (T, 32). — In Blair Co., Bell's Mills, ***Hamilton shales*** (Spec. 805–14, –25. — In Huntingdon Co. ***Ham. middle shales***, numerous along Muncy's run and at Cove Station (T3, 32, 111, 261). In *Ham. Upper Sandstone*, at end of Jack's mountain; on Crooked creek; near McConnellstown; and on Coffee run (355′ under Genessee). (T3, 111, 211, 199, 169). In ***Ham. Upper shales***, at Mapleton (Spec. 12,762); at Rough and Ready (12,756); and at Grafton (12,799, 12,859, two) 50′ beneath *Tully limestone* (T3. 109). — In Bedford Co. it prevails throughout the *Hamilton sandstone* (T2, 82); on Yellow creek, bed 30, sandstone, 2957′ beneath Stevenson's base of IX. — In Perry Co. Pisgah hill top (12,102, 12,106, twenty, with ***Rensselæia***); Clark's mill (12.422); Crawley Hill (12,461) all in ***Ham. sandstone***. Also in various places. Specs. 11,627 (4), 11,682 (10), 12,027, 12,535, 12,690, 12,838 (2), all in ***Ham. upper shales;*** and 12.227 (3), 12,337 (10) in the high ***Ham. fossil ore*** at Newport Narrows, and Crawley hill. — In the ***Chemung*** only one (Spec. 854–28, cast of ventral valve) is recorded, and that from Center Co. *VIII c*. — Notes by G. B. Simpson: 12,027, impression of one valve; 12,102, label wrong; 12,180, probably; 12,227, poor casts; 12,337, casts and impressions; 12,598 *a*, with *S. zigzac* and *Act. decussata ;* 12,601 *b*, with *S. fimbriata*, *O. vanuxemi*, and *Act.* — and corals; 12,690, indistinct; 12,762 (6) one of them showing the characteristic strong imbricating concentric striæ; 12,799 misnamed, it is ***Stroph. rhomboidalis***.

Spirifer niagarensis. (*Delthyris niagarensis*).—Hall, page 105, fig. 36, 1.—Conrad, Jour. Acad. Nat. Sci., Phila. Vol. 8, page 261, 1842.—Variety, **Sp. niagarensis oligoptycha.**—Roemer, Sil. Faun. W. Tenn., 1860.—Logan's Geol. Canada, 1863, fig. 329, puts it among the *Medina* and *Clinton fossils* of Western Canada.—In Pennsylvania, only reported from Bedford Co., at Wolfsburg, in the shale partings of *Clinton fossil ore;* and well preserved specimens at Jac. Walters' mine (T2, 144, 153.)— *Va.*

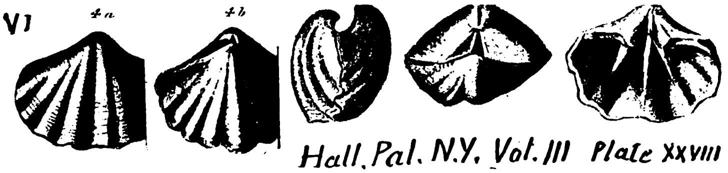




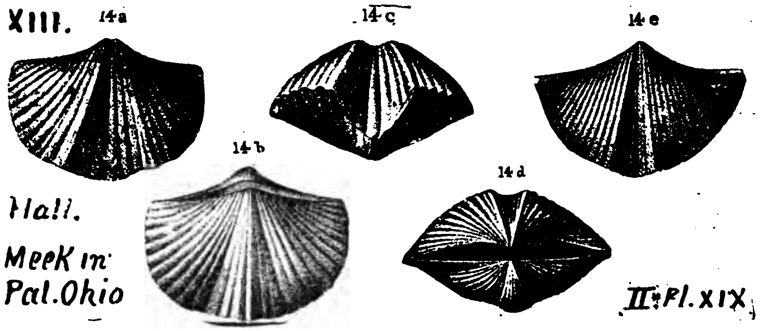
Spirifera nictavensis, Dawson. Acad. Geol. 1868, p. 499, fig. 176, *a*, shortened, *b* lengthened, by distortion, in the direction of the arrow; the most abundant fossil of the Nova Scotian Nictaux iron ore bed (abundant *Oriskany* fauna, J. Hall,); usually in casts, strongly distorted by slaty cleavage — *VII.*



Spirifera octocostata, Lowerby. Hall, Pal. N. Y., Vol. 3, 1859, page 205, plate 28, figs. 4*a*, *b*, *c*, ventral, dorsal, and profile views; (others omitted); *d*, hinge of another specimen; *e*, interior of ventral valve. About four rounded moderately prominent folds on each side, fading out towards the beak; fine regular, close overlapping concentric plate striæ; like, but rounder than the *Niagara S. crispa*, with a shorter area, rounder ends, and slighter folds; readily distinguished also from *S. bicostata*. Cumberland, Md. *Lower Helderberg.*—Two specimens *doubtfully* identified by Claypole, from the

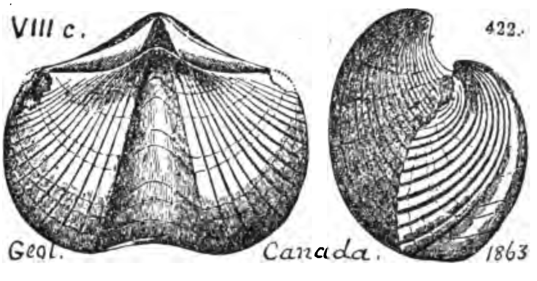

VI
4a
4b
Hall. Pal. N.Y. Vol. III Plate XXVIII

cherts beds at the top of the formation, in Perry Co., Pa. (12,806.) — Note. One is *S. macropleura;* the other difficult to make out. G. B. Simpson. — *VI.*

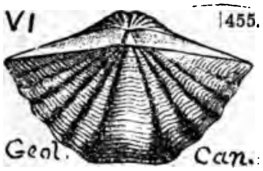


Spirifera (subgenus **Trigonotreta**) **opima,** Hall, Geol. Iowa, 1858. Compare the variety *S. subventricosa*, of McChesney, in Descr. Pal. Foss. 1860, 44. — Pal. Ohio, Vol. 2, 1875, page 329, plate 19, figs. 14 *a*, *b*, ventral and dorsal; *c*, *d*, front and back; *e*, ventral valve of another, more extended on the hinge, and narrower mesial sinus. Meek says that this, like other analogous species, is of variable form, in length of hinge and number of ribs, some of which sometimes fork once. Hall's *S. keokuk* is hard to distinguish from some of these Ohio shells, which range through the Iowa, Missouri, Illinois, Ohio, and W. Virginia *Coal measures. XIII.* — In S. W. Pennsylvania, reported by Stevenson (= *S. rockymontana*, Marcou) K3, 309; and by White in the *Ferriferous limestone* quarries south bank of Ohio river (K, 346); in Beaver, Lawrence and Mercer Cos. (Q, 62; Q2, 46,106; Q3, 25.) — *XIII.*

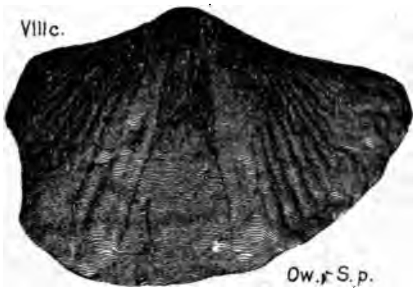
Spirifera parryana, Hall. Geology of Iowa, Vol. 1, part 2, 1858. — Geology of Canada, 1863, page 386, fig. 422 *a*, dorsal valve, *b*, side view, from the *Hamilton formation. VIII c.*



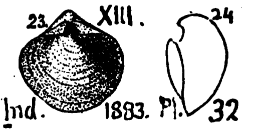
Spirifera perlamellosa, Hall. Pal. N. Y., Vol. 3, 1859, —— *L. Held.* — Geology of Canada, 1863, page 960, fig. 455. *Lower Helderberg formation. VI.* — In Pike Co., Bushkill, Hogback, Specs 608 - 7, - 10 (with *O. oblata,* both identified by J. Hall.); also by Dr. Barrett, at Port Jervis (G6, 134). — By Ewing, doubtfully, in Centre Co. (T4, 430). — By Stevenson, Imlertown, Bedford Co. (T2, 156.) — *VI.*



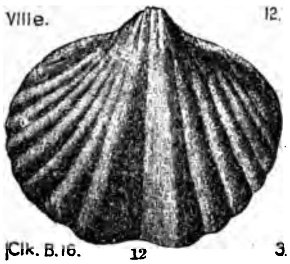
Spirifera pinnata (*Spirifera ligus,* var., Owen, Geol. Wisconsin, Iowa and Minnesota, 1852, plate 3A, fig. 2, from Hamilton strata, near Rockingham, Iowa. Doubtful specific form. — *VIII c.*



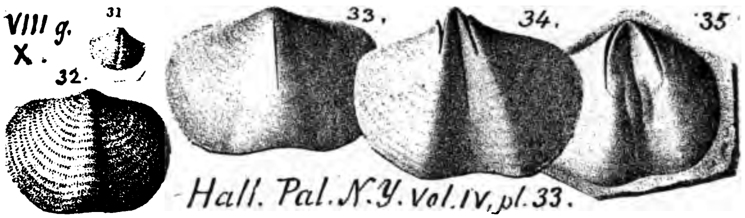
Spirifera (Martinia) planoconvexa, Shumard, in Swallow's Missouri Report of 1855. — Collett's Indiana Report of 1883, page 134, plate 32, fig. 23, *natural size,* back; fig. 24, side outline. A common American shell of the coal measures; very like Fleming's British *Spirifer urii;* and found, often in great numbers, from Virginia to Utah and New Nexico. — In Pennsylvania, (OOO, p. 253), Spec. C1 - 1 (twelve; some of them large blocks containing *hundreds of individuals*), C1 - 2a, C1 - 4 (three), C1 - 8 (many specimens), C1 - 9 (two); Spec. C2 1 (fourteen slabs, with *hundreds of individuals*), C2 2 (five), C2 -3 (many poor examples mixed with crinoid stems), C2 -4 (six), C2 -12 (four), C 2 -15 (three slabs with *hundreds* on them); all from Congruity, Westmoreland Co., abundant in both the *black* and *green crinoidal limestones* of the *Pittsburgh Barren measures.* (L, 35; K, 80; K2, 138.) — *XIV.*



Spirifera pluto. Clarke, Bull. 16, U. S. G. S. 1885, page 31, plate 3, fig. 12, *magnified 12* times; a minute shell, quite abundant, and varying little in size, in the Genesee black shales of Ontario county, N. Y. —VIII*e*.

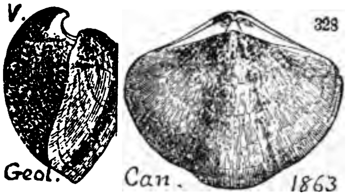


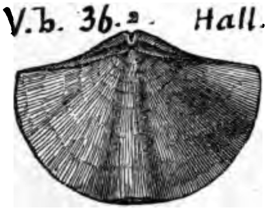
Spirifera præmatura, Hall. (Compare *S. pseudolineatus*, Hall, Geol. Iowa, 1859; and *S. hirtus*, W. & W. Proc. B. N. H. S. VIII, 1862.) Pal. N. Y. IV, 1867, page 250, plate 32, fig. 31, young ventral valve; 32, dorsal valve, covered with pustules, (from New York); 33, dorsal cast, showing impression of middle septum; 34, ventral cast; 35, another, with much larger beak cavity; the last three from a ferruginous sandstone near Meadville, Crawford Co., Pa., holding *S. alta*, *S. disjuncta*, etc. Recognized also by C. E. Hall in Spec. 890 - 3, Sherwood's coll. at E. Liberty, Bradford Co., Pa. (OOO, p. 249), in *Chemung rocks. VIII g.* — NOTE. The Meadville rocks belong to the *Lower Carboniferous* (*Pocono-Waverly*) *formation* (*X*), but were supposed formerly to be *Upper Chemung strata*, because holding many *Chemung fossils*. (Q4, p. 167.) ***Read carefully Hall's pages 251, 252, concerning the alliances of S. præmatura*** with *S. pseudolineata* of the *Keokuk* (XI), etc.

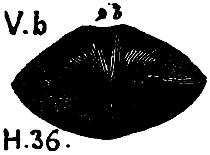

VIII g.
X.
31
32.
33.
34.
35.
Hall. Pal. N.Y. Vol. IV, pl. 33.

Spirifera prolata. (*Delthyris prolata*). Vanuxem, page 179, fig. 48, 3. *Chemung* formation. *VIII g.*

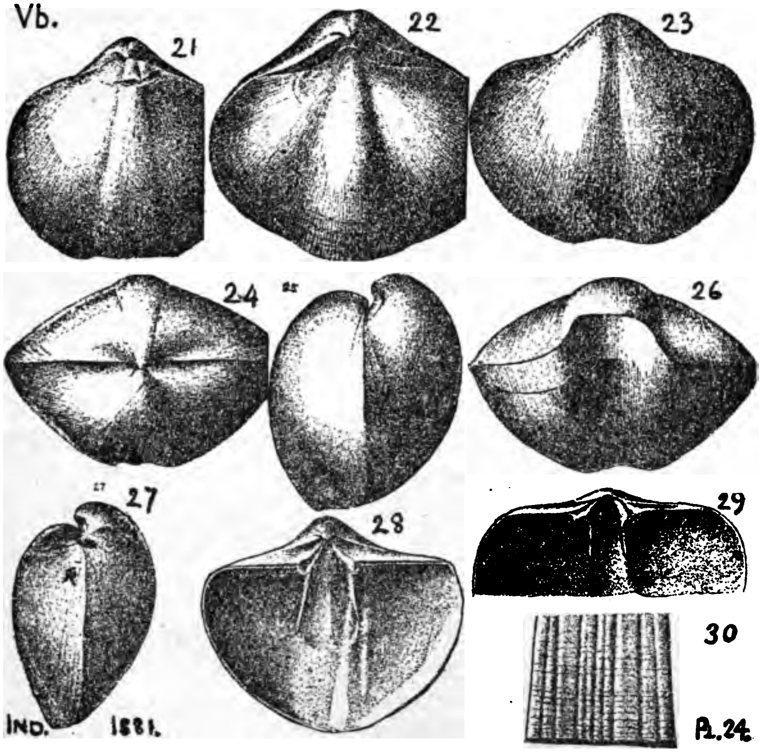
VIII. g.
3
Van. 48.3.







Spirifera radiata, Sowerby. Miner. Conch. Vol. 5, 1825.—(*Delthyris radiata*, Hall, Geol. N. Y., 1843, p. 105, figs. 36, 2, 2b. *Niagara.*) Geology of Canada, 1863, page 617, fig. 328 *a*, side and *b*, dorsal views of a specimen assigned a place by Logan among the W. Canada *Medina* and *Clinton* fossils. — Hall, in Indiana Rt. 1881, p. 296. plate 24, figs. 21 to 30. — In Pennsylvania only reported by C. E. Hall from Bells Mills, Blair Co., in the *Clinton shale.* — *V a.*

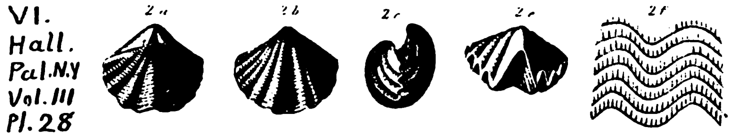


Spirifera (*Delthyris*) **raricosta,** Conrad. Jour. Acad. Nat. Sci. Philad. Vol. 8,1842. — Geology of Canada, 1863, page 372, fig. 382 *a*, dorsal; *b*, side; *c*, ventral views of a partially exfoliated specimen. *Corniferous limestone.* This, *the only Spirifera ever found in the Corniferous*, appears in the so-called *Marcellus limestone* of Claypole and White at West Huntingdon, Pa. (T3, 115); which justifies, as far as mere palæontology can weigh in such a question (certainly not much) my opinion that that formation is really the *Corniferous limestone. VIII a.*

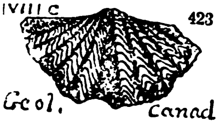
Spirifera resupinata. English species. See **Orthis resupinata.** *VIII d.*

Spirifera rockymontana, Marcou. See **Spirifera opima,** Hall. (K3, 309). *XIV.*

Spirifera saffordi, Hall. Pal. N. Y. Vol. 3, 1859, page 203, plate 28, fig. 2 *a*, *b*, *c*, *e*, dorsal, ventral, profile and front views; *f*, surface markings, which resemble those of *S. cycloptera*, and *S. crispa;* but the lamellæ are closer, the plications subangular or narrower, and the proportions of area and foramen quite different. From the *L. Held. shaley limestone* near Hudson, N. Y. and Decatur Co., Tennessee. — In Pennsylvania, Clark's mill, Claypole's Specs. 11,797 (a box full) are from the upper shaley beds just under the Oriskany sandstone. *VI.*



Spirifera (*Delthyris*) **sculptilis,** Hall. Geol. N. Y. 1843, page 202. fig. 81, 6. *Hamilton.* — Geology of Canada, 1863, page 386, fig. 423, a Canadian specimen from



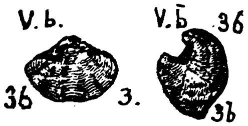
the *Hamilton.* — In Pennsylvania, Monroe Co., collected at Marshall's falls, Spec. 807–57, a cast (OOO, 216). *VIII c.*

Spirifera sinuata. See **Spirifera decemplicata**.

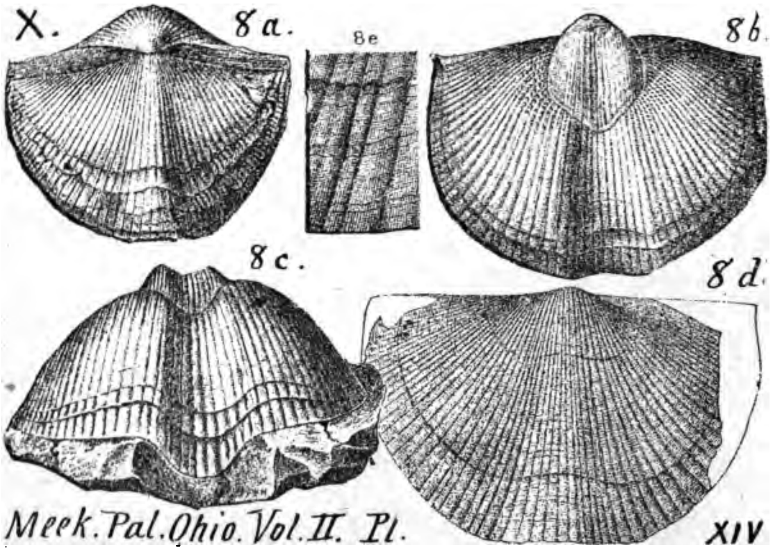
Spirifera solidirostris, White. Bost. Jour. Nat. Hist. 1860. *Kinderhook limestone.* Occurs among multitudes of *Rhynchonella sagerana*, *Orthis michelini*, *Macrodon hamiltoniæ*, etc., in the bottom layers of the *Bedford red shale* at Bedford, Ohio. Winchell's large *Syringothyris typa* is numerous with them there, and found also by Randall at Warren (Report I, p. 73). This red shale ought to represent the *Catskill formation. IX.*

Spirifera spiriferoides. See **Athyris spiriferoides.** See figure of it in A. Winchell's Geological Studies, 1886, page 228, fig. 162. *VIII a*, *VIII c.*

Spirifera staminea. (*Delthyris crispa*), Hall, G. N. Y. 1843, page 105, figs. 36, 3, 3b, *Niagara*, *Vb.* (See Murchison's Silurian Researches, p. 624, pl. 13, fig. 8. — Dalman 122, t. 3, fig 6. — Hisinger). Found by Ashburner and Hale, Spec. 505–30, at McKee's fossil ore bank, Mifflin Co., Pa. (OO, p. 233) in *Clinton shales*, *V a.*



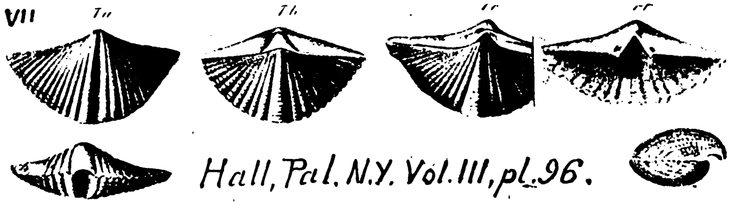
Spirifera striatiformis, Meek. Pal. Ohio, Vol. 2, 1875, page



Meek. Pal. Ohio. Vol. II. Pl. XIV

219, plate 14, fig. 8 *a*, back of medium sized specimen showing hinge-area, etc.; 8 *b*, internal cast of ventral valve; 8 *c*, front view of same; 8 *d*, part of external cast of dorsal valve, showing fine surface markings; 8 *e*, *magnified* minute cross and long lines on surface. (*Trigonotreta striatiformis*, König, 1825.) Externally like Fischer's Russian *S. mosquensis* (Davidson's figured British specimens of it); also less like Sowerby's *S. striata* (see Davidson's illust. of markings of its variety *clathrata*). Sciotoville and elsewhere in Ohio. *Waverly.* In Lawrence Co., Pa., found by White in the *Mercer lower limestone*, and in the ore which makes its roof (Q2, 61, 173), between the middle and upper sub-divisions of the *Pottsville conglomerate. X; XII.*

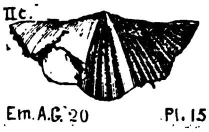
Spirifera submucronata, Hall. 10th Regent's Report,


VII
7a
7b
Hall, Pal. N.Y. Vol. III, pl. 96.

1857. Pal. N. Y. Vol. 3, 1859, page 419, plate 96, fig. 7 *a*, *b*, ventral and dorsal valves; *c*, specimen with longer hinge angle; *d*, its front view; *e*, a profile; *f*, ventral interior. Like *S. cumberlandiæ*, but smaller and more delicate; smoother; fewer folds; ventral scar smaller and less distinctly striated; median septum scarcely developed below beak cavity. Cumberland, Md. *Oriskany sandstone.* — In Pennsylvania, Montour Co., Grove tunnel. (G7, p. 86, 297). *VII.*

Spirifera sulcata. *Delthyris sulcatus*, Hisinger, Petrifact. Suecica, 1837, *Niagara* formation. *V b.* — Rogers, Geol. Penn., 1858, page 285, fig. 644, in the Aughwick Valley, Huntingdon Co. *Lower Helderberg. VI.*

Spirifera trentonensis. Emmons American Geology, Vol. 1, part 2, 1855, page 235, plate 15, fig. 20; found in the upper part of the *Trenton limestone* formation, by Emmons; but not recognized by S. A. Miller. *II c.*

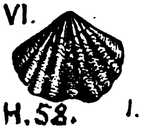


Spirifer umbonatus, in G6, p. 116, a mistake for *Ambocœlia.*

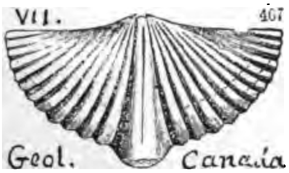
Spirifera undulata. Vanuxem, Geol. Third Dist. N. Y., 1842, page 132, fig. 31, 3.—Hall, Geol. Fourth Dist. N. Y., 1843, plate fig. [34, 3]. Not common in Western New York; only seen at one or two places, in the *Onondaga* (*U. Held.*) *limestone. VIII a.*

Spirifera urii, an English species, is apparently represented in America by **S. planoconvexa** of the *Coal measures. XIII.*

Spirifera vanuxemi. (*Orthis plicata*). Vanuxem. Geol. N. Y. 1842, page 112, fig. 23, 1.—Hall, Geol. N. Y. 1843, page 142, fig. 58, 1. *Lower Helderberg.* (Name changed by Hall in Pal. N. Y. 1859). In Pennsylvania, found by Dr. Barrett at Port Jervis on the Delaware (G6, 134).—In Perry Co., Claypole, Spec. 12,870, at Stewart's, 2½ m. north of Liverpool, in *Catskill* (about 25 specimens of a small Spirifera in one comparatively small hand specimen; along with specimens of *Stroph. rugosa.* G. B. S.). *IX.*—In Bedford Co. by Stevenson, in the middle blue flaggy *L. Held. limestone* (*like* the *Trenton limestone* of N. Y., T2, 89, 148). Also Spec. 12,906. *VI.*

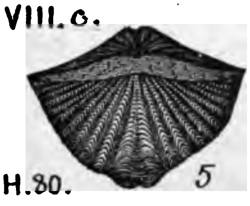


Spirifera varicosa, Hall. Tenth N. Y. report, 1857, *Upper Helderberg.*—Geology of Canada, 1863, page 960, fig. 467, a dorsal valve assigned by Logan to the *Oriskany sandstone. VI; VII.*



Spirifera verneulli, a synonym for **Spirifera disjuncta.**

Spirifera ziczac. (*Delthyris ziczac*) Hall, Geol. N. Y. 1843, page 200, fig. 80, 5 *Hamilton.*—In Pennsylvania, Columbia Co., between Bloom and Catawissa, and also on the Lycoming Co. line (G7, 75, 207, 289), both in White's *Tully limestone*, at the top of the *Hamilton.*—In Monroe Co. near Stroudsburg, Spec. 12,598, from



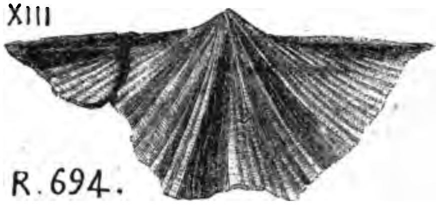
Marcellus. VIII b. — In Perry Co. around N. Bloomfield, at Barnett's, and on Sherman's creek Spec. 11,704 (18; some of them looking more *S. mucronata*, and *S. sculptilis*, being distinguished from other shells of this size by the few prominent plications); 12,019 (poor); 12,394; 12,489 (4, on one of which is a good exhibition of the epetheca of a *Lichenalia* with recumbent portion of the cell tubes. G. B. S.), all in *Ham. upper shales.* — In Huntingdon Co. very abundant in all the beds of the *Hamilton upper sandstone*, especially the limy beds No. 23 of the Patterson section, bed 12 of Shoup's run section, and bed 4 of Connellstown section. (T3, 110, 179, 184, 186, 199). — *VIII c, d.*

Spirifera ——? In the collections, OO, p. —, will be found doubtful and fragmentary specimens from the *Clinton* 506–11; from the *Lower Helderberg*, 610–12; from the *Oriskany*, 703–7 (two casts); from the *Hamilton*, 806–8, 807–32, -57 (two); from the *Upper Helderberg*, 810–1; and from the *Chemung*, 860–29 (cast), 872–4 (large slab full of this and other brachiopods, all in poor condition), 880–3, 881–2. Also 860–10 (two) probably casts of the ventral valve of 850–25, with the aspect of *Atrypa* casts, but too wide, from Mansfield, Tioga Co., from *Upper Chemung.* (G. B. Simpson).

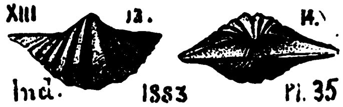
Spirifera ———. Vanuxem, page 179, fig. 48, 6. Very abundant in Middle New York. *Chemung, VIII g.*

VIII g.
Vx.48.
6

Spirifera ———. Rogers, page 838, fig. 694. *Coal Measures.*



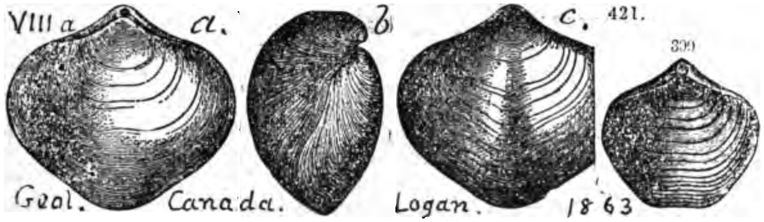
Spiriferina cristata, Schlotheim. Dawson's Acad. Geol. 1868, p. 292. fig. 90. Probably the same as *S. octoplicata.* Very numerous in Nova Scotia; especially in the Brookfield shell conglomerate of the *Carboniferous limestone. XIII.*



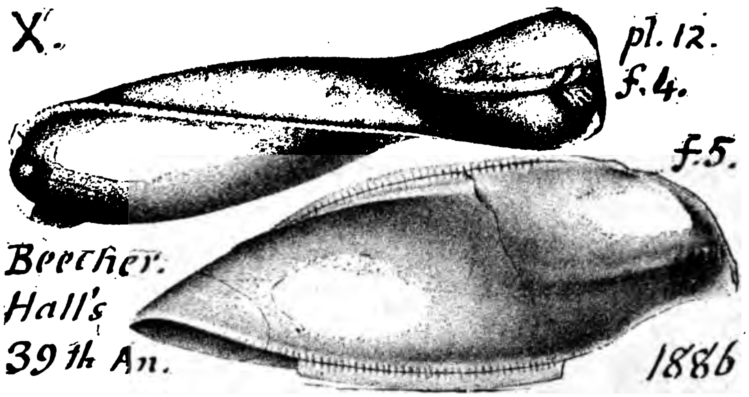
Spiriferina kentuckensis. (*Spirifer kentuckensis*, Shumard, in Swallow's Missouri Rt. 1855). Meek, Nebraska Rt. 1872. Collett's Indiana Rt. 1883, page 135, plate 35, figs. 13, 14, *natural size*, ventral and hinge views. One of the more common (but nowhere abundant) Indiana *Middle* and *Upper Coal Measure* species. *XIII*, *XV*.

Spiriferina norwoodana. Hall, Trans. Albany Inst. Vol. 4, 1856. Whitfield, Bull. 3, Am. Mus. N. A. 1882, plate 6, figs. 16, 17. Collett's Indiana Rt. 1882, page 327, plate 29, fig. 16, 17, *magnified three times*, back and front views of type specimen, from Alton, Spergen Hill, etc. *Subcarb. limestone. XI.*

Spirigera (now **Athyris**) **concentrica,** Von Buch. Geol. Canada, 1863, page 373, fig. 399, a specimen with the front margin truncated or squared off; from the *Corniferous limestone. VIII a.* Also, page 385, fig. 421, *a*, *b*, *c*, dorsal, side, and ventral views of a specimen from the *Hamilton formation. VIII c.*

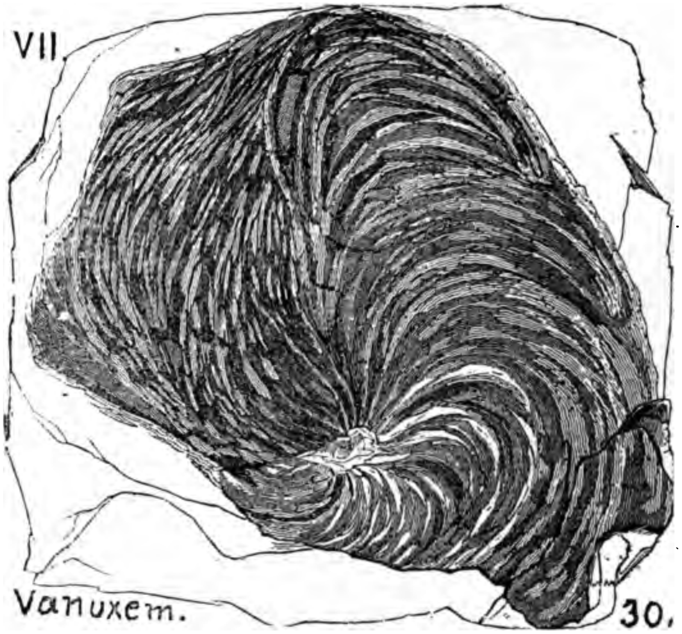


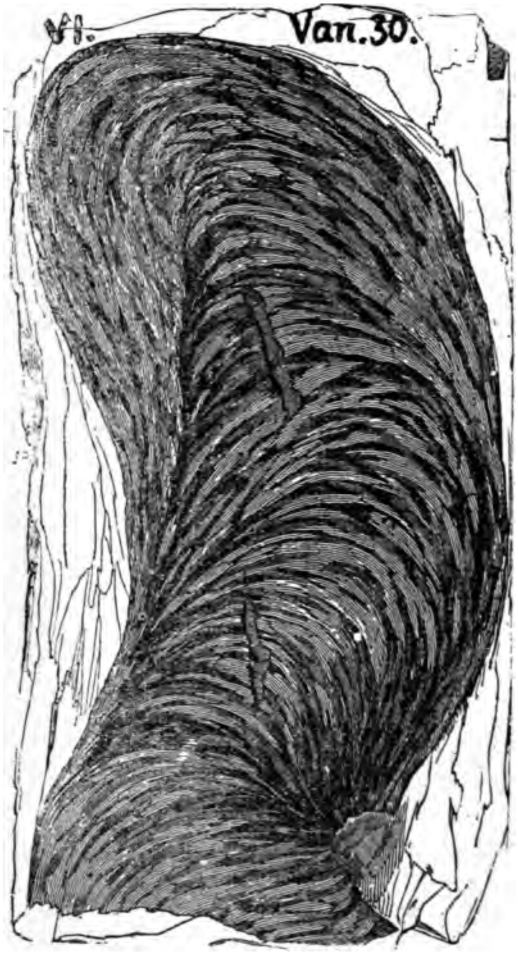
Spirodomus insignis, Beecher. Hall, 39th An. Rt. N. Y. St. Mus. 1886, p. 162, plate 12, fig. 4, vertical aspect of a specimen (partial cast of interior) showing scars, pallial line and crenulated margins; fig. 5, left side of the embedded specimen in the rock; shell thin; specimen unique, unlike any other extinct or living form; could be produced by twisting a *Solen ;* its form suggests *Parallelopipedum*, but is evidently not an *Arca ;* in some points resembles some forms of *Pholas ;* its spiral shape is strongly indicative of burrowing habits; remains of several individuals in one small piece of rock prove them gregarious like the burrowing shells; twisted shell could not open widely; shape of front end shows that they had no



well developed foot for locomotion. The *Waverly* strata at Warren, Pa., were shore deposits, judging from the numerous mud furrows, land plants and drifted and worn shells; also a conglomerate bed. See also *Spiraxis randalli* of Newberry, and other unusual and undescribed shells. (C. E. Beecher) *X*.

Spirophyton caudagalli. (*Fucoides caudagalli*). Va

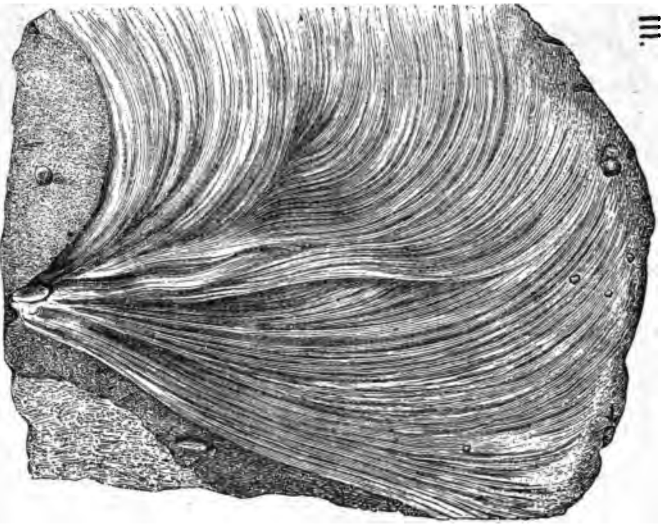




nuxem. Geology of the Third District of New York, 1842, page 828, fig. 30. — Rogers, Geology of Pennsylvania, 1858, p. 826, plate 21, *top of the Oriskany formation. VII b.* In Monroe Co., Pa., instead of its abundance in New York, only one specimen of this (and none of any other fossil) was seen by White in the beds lying between the top of the *Oriskany sandstone* and the bottom of *Corniferous limestone.* (G6, 226). In Blair Co., however, I have seen an immense block full of it, lying exposed outside of Tyrone city, at its proper horizon. In Huntingdon Co., at the south end of Jack's mountain, it is numerous in the *Hamilton middle sandstone*, and also *upper sandstone.* (T, 32; T3, 111). See *S. velum*, below. *VIII c.*

Spirophyton cincinnaticum. Zittel, Vol. 2, lief. 1 page 55, fig. 43. Hisinger's *Fucoides cincinnatus*, in Leth. Suecica, Suppl. II. Also? Roualt's *Daedalus.* — Zittel's name *Alectorurus* seems unnecessary. Found in the Lower blue slate at Cincinnati. *III b.*

Spirophyton is now usually called **Taonurus.**

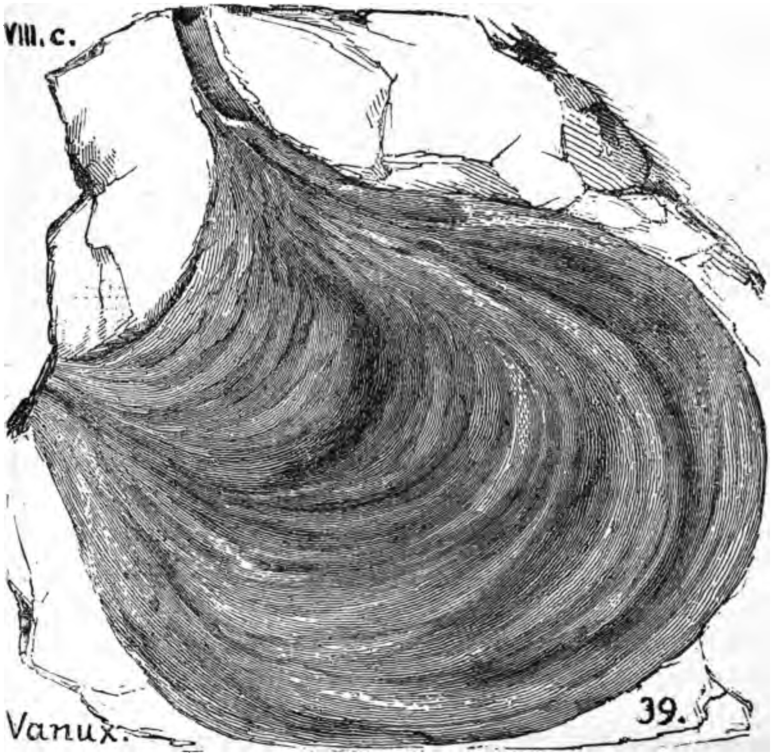


Zittel.

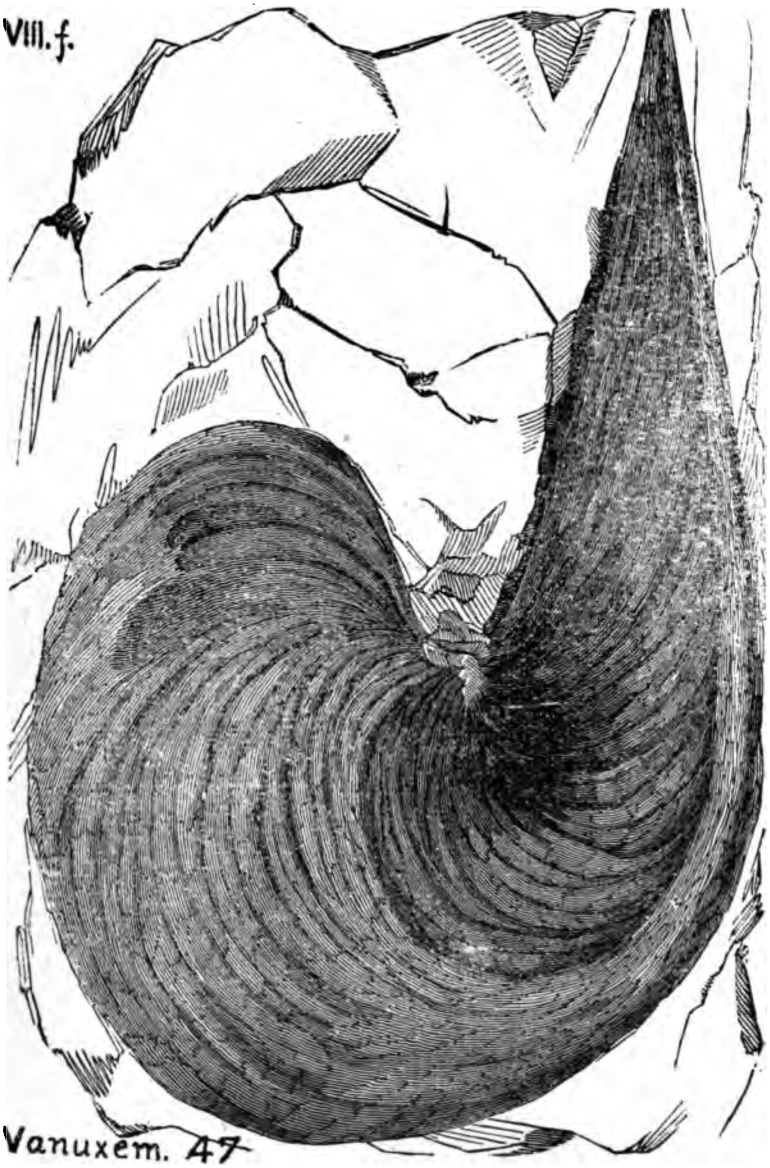
Fig. 43.

Alectorurus cincinnaticus Sch. Untersilur v. Cincinnati.

Spirophyton velum. (*Fucoides velum*, Vanuxem. Geol.



VIII. f.



Vanuxem. 47

Third Dist. N. Y., 1842, page 160, fig. 30, in the *Hamilton;* and page 177, fig. 47, in the *Portage*). — Specially numerous in the Patterson section, bed 23, Penn township, Huntingdon Co., Pa., in the *Hamilton upper limy layers.* (T3, 184, 186).

In *Ham. upper sandstone*, bed 4 of McConnellstown section; bed 11 of the Mapleton section; also just under *Tully ? limestone* (T3, 199, 273).—At Barnett's mills, Perry Co., Spec. 11,-693, from *Ham. upper shales. VIII c; VIII f.*—In Bedford Co. a fine species (see **Taonurus crassus**) occurs at several horizons in the *Hamilton;* as, near Buena Vista; at Yellow creek, bed No. 28, 2776′ beneath Stevenson's base of *Catskill;* also bed No. 49, and 51 of the Saxton section, in *Hamilton middle sandstone.* (T2, 83, 118, 226, 231). *VIII c.*

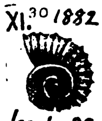
Spirophyton typum, near **Taonurus colletti.** XV.

Spirophyton specimens are among Carll's collections from *Upper Chemung ?*—Claypole's Spec. 12833 is from Roseburg, Perry Co. *Ham. upper shales.*—Stevenson reports indistinct impressions in the *Pittsburgh sandstone*, Dunkard Cr., Bobtown, Greene Co. (K, 95; K3, 306.)—*VIII c; VIII g; XV.*

Spiropteris villosa, Lesq. reported among the plants under the *Darlington Cannel coal bed*, at Cannelton, Pa. (Q, 55.)

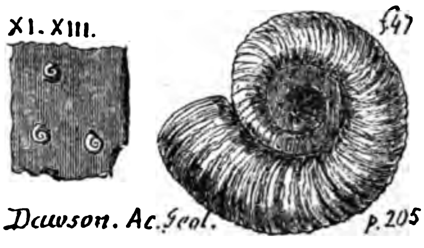
Spirorbis angulatus, Hall. Fifteenth R. Rt. N. Y., 1862. A little coiled worm-shell of the *Hamilton upper shales* in Perry Co., Pa. Claypole's Spec. 11,669, 11,671, 11,750 from Barnett's mills; and 11,758, with *Chonetes coronatus.*—*VIII c.*

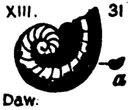
Spirorbis annulatus. (Hall, Trans. Alb. Inst. Vol. 4, 1856. Whitfield Bull. 3, Am. Mus. N. H. 1882, plate 9, fig. 30.) Collett's Ind. Rt. 1882, page 374, plate 32, fig. *enlarged twice*, lower side of shell. Species, like others, very irregular in the tightness of its rolls, etc., Alton, Ill., Spergen Hill, etc., Ind. *Subcarb. XI.*



Spirorbis annulosus, var. ? **nodulosus.** *XI.*

Spirorbis carbonarius, Dawson. Acadian Geology, 1868, page 182, fig. 31, *magnified; a, natural size;* in bituminous limestones of the Joggins *coal measures*, Nova Scotia.—In Pennsylvania, Luzerne Co., Campbell's

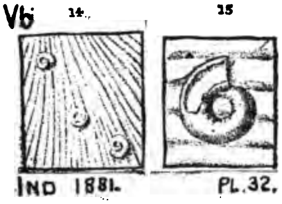




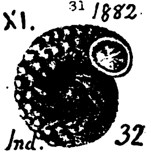
ledge, attached to plants at the base of *Pottsville conglomerate*, (G7, 41.)—In Fayette Co., Salt Lick township, in vast numbers in the cannel shale roof of Spark's *Freeport upper coal* (K3, 116.) — In Beaver Co., in the *Aviculopecten bed* under the *Ferriferous limestone* (Q, 205.) — In Washington Co. roof shale of *Washington limestone* (OOO, 255, Spec. C 5-8b) — *XII*, *XIII*, *XV*.

Dawson's Acad. Geol. p. 205, fig. 47; minute worm-shells, living together in countless numbers attached to coal-plants and *naiadite* shells in all the brackish and fresh lagoon water of the coal age everywhere; called in England *Microconchus carbonarius*. NOTE. — So long as it was considered a seawater shell its attachment to *Sigillariæ* was an argument for the marine origin of coal; but it is often found *inside the bark* of the Nova Scotia erect *Sigillariæ*, showing that the trees had become dead and hollow. *Spirorbis* shells grew fast and bred abundantly, fastening upon all vegetable things as soon as they became submerged, just as their modern allies cover the leaves of *laminaria* and *seaweeds* now. (Dawson).—Strangely enough, Goeppert describes it as a fungus, and names it *Gyromycis ammonis*.

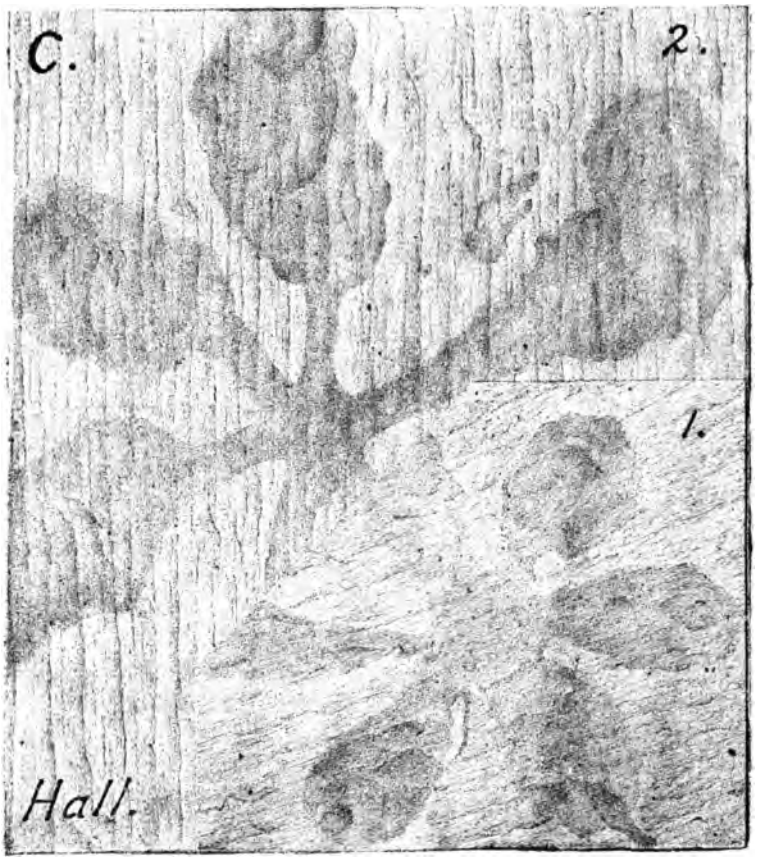
Spirorbis inornatus, Hall. From Collett's Indiana Report of 1881, page 327, plate 32, fig. 14. a group of these specimens, nat. size, attached to the surface of a *Strophomena*; fig, 15, a specimen enlarged, to show the character of the shell, and the incipient annulations *Niagara*, *V b*.—NOTE. Possibly this is the *Spirorbis* reported by Stevenson in the blue flaggy middle layers of *Lower Helderberg* (like the *Tentaculite limestone beds* of New York) at Bedford Springs, Pa. (T2, 89, 148.)—*VI*.



Spirorbis nodulosus. (Hall, in Trans. Alb. Inst. made it only a variety of *annulosus*.) Whitfield Bull. 3, Amer Mus. Nat. Hist., N. Y., 1882, plate 9, fig. 31, copied by Collett, in Indiana Rt. of 1882, page 375, plate 31, fig. 31, *enlarged fourfold*, type specimen. — Spergen Hill, etc., Ind. *Subcarboniferous XI*.



Spirorbis ? *Lower Silurian.* Specimen 203-44 (numerous individuals, good for drawing, G. B. S. 1888) in C E. Hall's Bellefonte collections, Centre Co., Pa. Spec. 210-75 (a poor impression from the same locality). *Trenton limestone, II c.*



Sponges ? in the *Cambrian Roofing slate* of Middle Granville, Washington Co., N. Y., **Dactyloidites bulbosus**, Hall, State Mus. N. Hist. N. Y. Report 39, 1886, page 160, plate 11, fig. 1, small specimen, six rays, concentric lines at distal extremities; 2, a larger one, the bulbs of which are distinctly stalked. Fossils are very unusual in this formation. These differ from all known *graptolites* in having a six-rayed structure; moreover, characteristic graptolites have not been found in these slates; but true plants (seaweeds, *Fucoides flexuosa*, Emmons) occur; and this fact makes it possible that *D. bulbosus* belongs to the marine algæ, or more probably to the sponges. (Hall.)—NOTE. Compare *Dactylophycus tridigitatum*, Miller & Dyer; and *Ichnophycus tridactylum*, Hall.—*Cambrian.*

Sponges provisionally assigned to the genera *Placoscyphia*, Reuss, *Astrocladia*, Zittell, *Dichoplectella*, Matthew, and *Hyalostella*, Zittell, are described and figured by Matthew in Trans. R. S. Canada, 1889, page 148–150, plate VII (for figures see the names above in Appendix), as found in *Sub St. John* and *St. John groups*, N. B. — NOTE. Attached to the walls of the cavities of these sponges are minute amber-colored, hyaline, silicified organisms the nature of which is not known. Covered up by the calcite which fills the cavities, when the calcite is dissolved by acids these organisms become visible, together with other and amorphous concretions of silica. Matthew has described them under the generic and specific names of **Monadites globulosus, M. pyriformis, M. urceiformis,** and **Radiolarites ovalis,** which see. But he queries if some of them be not recent introductions. — The *Cambrian* sponges of the *St. John series* are various representatives of the Hexactinellid order; quite perfect spicules of their skeletons appear in great numbers on many layers of the shales; they are also scattered through the more sandy beds, but generally in a more broken condition; in the shales different species can be recognized; no one has a regular cup-shaped cavity; their organic matter has given smooth surfaces to the layers of rock; and where the sponges were abundant they make glossy black spots on the clay shale. — *Lower Cambrian. L. C.*

Sponges have been found in Levis black strata (*L. Silurian*) at Metis bay, south bank of the St. Lawrence. Dawson, in Trans. R. S. Canada, Vol. VIII, 1889; see *Protospongia*, *Lasiothrix*, *Hyalostelia*, *Cyathospongia*, *Acanthodictya*. Others too obscure to be described and named are alluded to on page 52, 53, of that issue. The sponges are very numerous in several layers of black lime-shale, each several inches thick, in a total of 40 feet of rock; perfectly flattened; changed into pyrites; in some cases retaining their general outlines and retaining their roots or anchoring rods; associated with *Retiolites ensiformis*, Hall., many trails of worms, *Arenicolites spiralis* (worm casings or burrows), *Buthrotrephis pergracilis*, Daws., and *Linnarssonia* (*Obolella*) *pretiosa*, Billings, fossils which indicate the base of the *Levis division* of the *Quebec group;* the Welsh sponges being much older (of *Cambrian age*)*: P. fenestrata*, Salter, also pyritired; *P. flabella*, Hicks, from the *Menevian*, and *P. major*, Hicks, from the *Lower Cambrian Longmynd series*. Matthew has figured fragments of *Protospongia* from the Lower Cambrian of St. John, N. B. The Irish *Acanthospongia* of Griffiths is of *Silurian* date. In the Metis series are conglomerate beds holding boulders of limestone (in which are trilobites, *Solenopleura*, and other fossils, in fragments) of probably *Lower Cambrian* age.

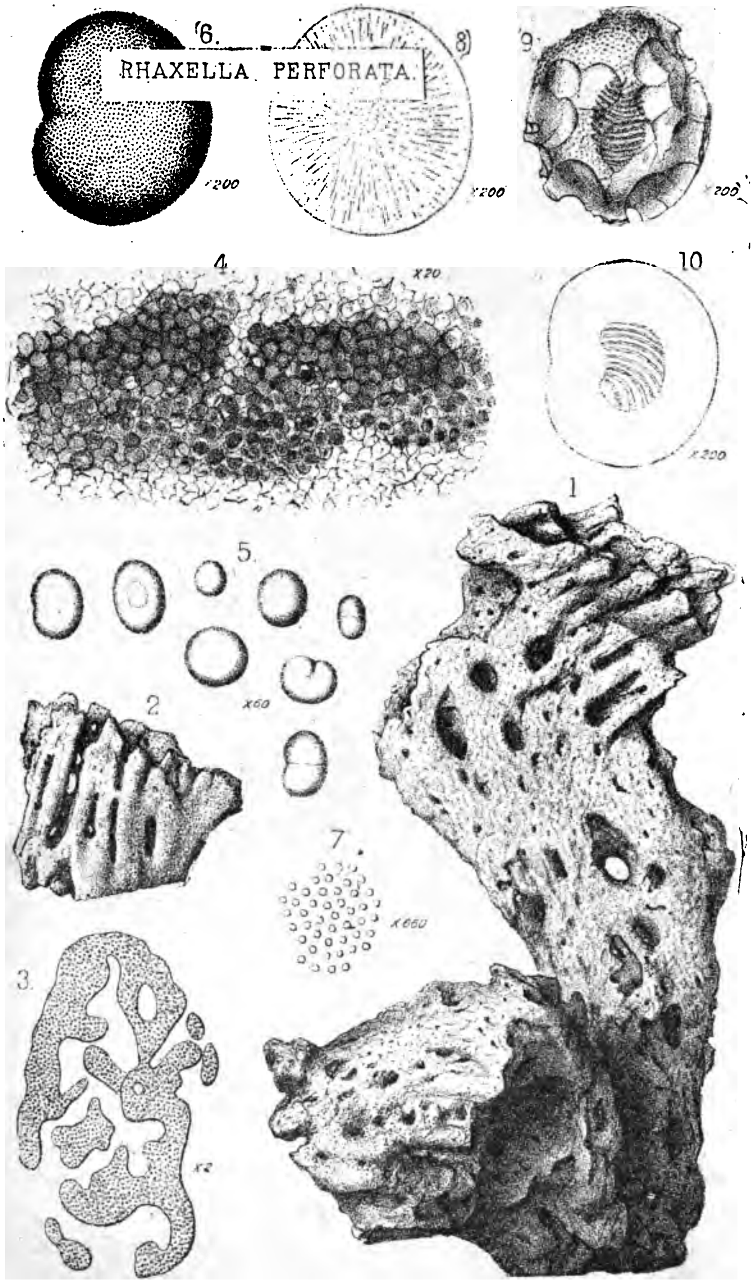
Sponges in the *Calciferous sandstone formation* (*Division B*, of Brainard and Seely), Bul. Geol. Soc. Amer. Vol. 1, 1890, page 503 With Vanuxem's *Orthoceras primogenium* are remarkable hemispherical banded masses, once thought to be concretions, resting on a layer of *oolite*, described by Dr. J. H. Steel in Amer. Jour. Sci. Vol. 9, 1825, p. 16, with figure, copied by Mather, in Geol of N. Y., First Dist., 1842, p. 11, 416, and pronounced by him *organic*. Masses from Shoreham, Vermont, 6 to 20 inches in diameter, purplish, and banded like an agate in concentric spheres, show microscopic spongy calcarous sponge canals irregularly penetrating the granular mass, and they may be allied to Hall's *Cryptozoon proliferum* (See p. 163 above) as, say, *Cryptozoon steeli*. It is to be noted that these sponges occupy the Birdseye-like pure flinty limestone just above the middle of this Division B; and that (150 feet lower) at the top of Division A are large masses of black scoriaceous chert; and in some of the beds abundant nodules of white quartz.

Sponges in the *Utica slate*. See Whitfield's **Rhombodictya reniforme** below.

Sponges of undetermined genera and species (OOO, 204) Spec. 61–36 (three) in the collections at Orbisonia, Huntingdon Co., Pa., from *Lower Helderberg limestone. VI.*

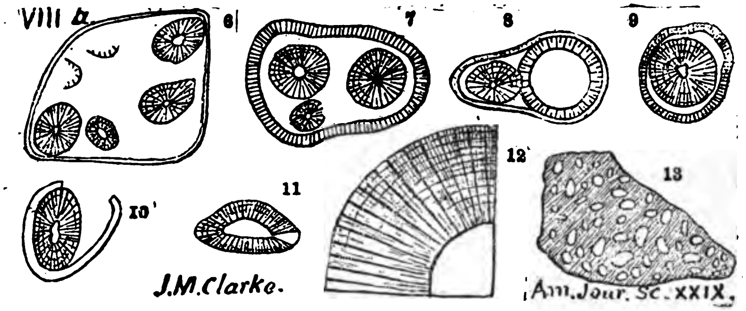
Sponges in the *Coral Rag*, of England. See **Rhaxella**

RHAXELLA PERFORATA.

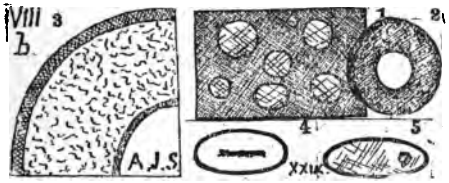


perforata, Hind, Q. J. Geol. Soc. Lond. Vol. 46, Feb., 1890, page 59, plate 6, fig. 1, *natural size*, showing irregular growth and perforated walls; 2, another specimen; 3 (X 2) cross section; 4 (X 20) cross section of wall plates, showing it composed of globate spicules; 5 (X 60) several globate spicules dissolved out; 6 (X 200) a spicule greatly magnified; 7, its surface *magnified 660 times linear ;* 8, one *enlarged 200 times* to show the radial fibres; 9, one (X 200) corroded on surface, and inside filled with banded chalcedony; 10, one (X 200) with replaced core, but unchanged surface. "These *sponges* furnish additional proof the connection between these organisms and beds of *chert* and silica (other than quartz). Thus, in the Cliff at Scarborough, as Mr. Hudleston has shown, there is in the Lower calcareous grit, from which these sponges have been obtained, a bed 3⅓ feet of intensely hard *chert*, and beneath this, thirty feet of calc. grit largely cemented with silica. There can be little doubt that most of the silica in this considerable thickness of rock (not reckoning the sand grains) is due to the siliceous sponges. * * * Where the minute globates are not themselves now present, they are represented by minute empty molds," etc. (Hinde).

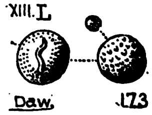
Sporangites (*Protosalvinia*) **bilobata,** Dawson. J. M.



Clarke's Devonian Spores in Am. Jour. Sci. Vol. 29, 1885, page 284, fig. 6, (*X 20,*) spore-case with four perfect maeroscopes, case not well preserved; 7, a better preserved case with three spores; 8, with two; 9, with only one, unless it be a cross section of a long case which had others in line; 10, case bursting; 11, a spore with apparent opening to its cavity; 12, spore *much* *magnified;* 13, spores; (*all except 12 mag. 20.*) — From *Marcellus lime shales* in Ontario Co., N. Y., *VIII b.* — Note. The macrospores are usually free from their cases, and so abundant as to make up the principal portion of the rock. Usually there is a vacant space around the calcite which has crystallized inside of them. (Compare *Aetheotesta*, Brongniart, for radiating fibres of wall.) The microspores, minute bodies associated with the larger (macrospores), are less abundant; $\frac{1}{8}$ to $\frac{1}{20}$ millimeter; round or oval; with a coaly coat but no visible structure, their cases (if any) not discovered; generally not mixed with the macrospores, but in clusters or masses by themselves. — N. American representatives of the *Protosalvinia bilobata* of Brazil. Probably the pollen of plants, doubtless the origin or source of the bitumen of the black *Marcellus* and *Genesee* shale formations, and perhaps of a part of the West Canada petroleum.



Sporangites huronensis, Dawson. J. M. Clarke's paper on Devonian spores in Amer. Jour. Sci. Vol. 29, 1885, page 284, fig. 1, *enlarged 10 diameters*, preserving a thin coaly outer wall, and filled with calcite, from the *Marcellus* shale, Canandaigua, N. Y.; fig. 2, *enlarged 20 diameters*, showing dense wall with thicker outside and inside layers, filled with calcite; fig. 3, section, *enlarged;* fig. 4, (X 20,) a somewhat flattened individual spore, preserving only the dense outside layer, and a coaly mass in center, the usual condition when part of outer wall was removed; fig. 5, (X 20), one showing crystalline calcite in original interior cavity (?); all from *Corniferous limestone*, Ont. Co., N. Y.— *VIII a, b.*

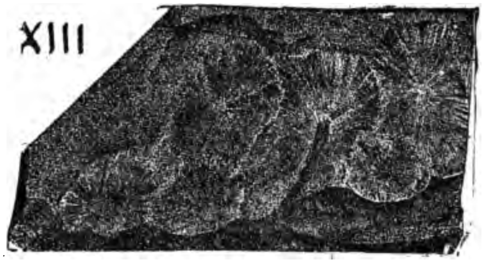


Sporangites papillata, Dawson. Acad. Geol. 1868, page 459, 460, fig. 173 L, *natural size*, and *magnified*. Dawson uses this name for the rounded *spore-cases* of *Lepidodendron* and its allies, very frequent in coal. A smooth round kind, like mustard seed, is excessively abundant in the *Lower Carboniferous*, at Horton, N. Scotia, found with and belonging to *L. corrugatum.* The species here figured is covered with papillæ; it constitutes nearly the whole of some layers in coal bed No. 12 of group XIX of the Joggin's section, associated with *Cordaites*; but what plant it belonged to is not known. (Dawson.)—*XIII.*

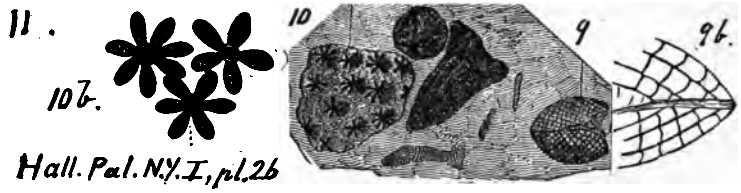
Sporocystis planus, Lesq. (meaning *blader-seed.*) Coal Flora, 1880, page 458, plate 69, figs. 13, 14, 15, 15*a*, flat seeds surrounded by a large border, variable in form and size, connected together by the angular borders like a mosaic work; groups, round or oval, apparently glued together, with very small central mamillæ; like the bunched seeds at the base of the *Selagineæ.* Abundant under or just inside of the Conglomerate at Pittston. Lacoe's collection. (G7., 40) — *XII.*

Star-fish crinoids. See **Palæaster granulosus, incomptus, jamesii, shafferi,** etc. See Randall's collections at Warren, Pa., in the middle 200′ of *Subcarboniferous strata.* (Report I, p. 53.)—*X.*

A **Stegocephalian** reptile of the Ohio *coal measures* figured by Cope in Pal. Ohio, Vol. — , plate 42, fig. 5, which gives a view from above of the three bony shields which protected its breast. Nothing more is known of the reptile. *XIII.*



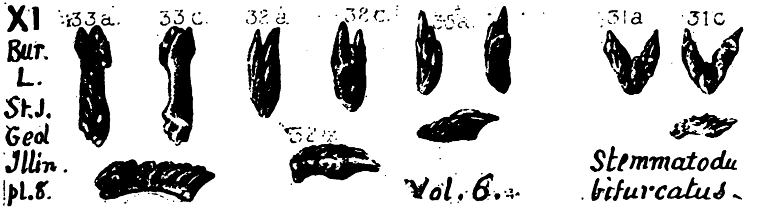
Stellipora antheloidea, Hall. (*Constellaria polystomella,*


11.
10b.
10
9
9b.
Hall. Pal. N.Y. I, pl. 26

Nicholson, Pal. Ohio, Vol. 2, 1875, page 215, plate 22, fig. 7, a) — Hall, Pal. N. Y. Vol. 1, 1847, plate 26, fig. 10, specimen of slate with this species on it and also *Retepora? foliacea* (of which fig. 9b is an *enlargement*); 10 *b*, an *enlargement* of three of the stars, showing points or pores on their upper surface; several stars showing irregularities at the center indicative of duplication. A unique specimen in the fine private collection of Mr. Luke Wilder, Lowville, Lewis Co., N. Y. *Trenton limestone* (central beds.) *II c.*

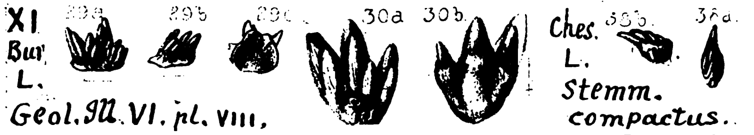
Stemmatodus. St. John and Worthen, Geol. Ill. Vol. 6, 1875. Seven species of this genus of Subcarboniferous fishes, described by them: ***bicristatus***, ***bifurcatus***, ***cheiriformis***, ***compactus***, ***keokuk***, ***simplex***, ***symmetricus***, are found in the *Burlington*, *Chester* and *Keokuk* (*subcarb.*) *limestones* of the West. —In Pennsylvania, the scales of one or more of these species are frequently seen in the *Meadville upper limestone*, Crawford Co. (Q 4, 83) which is considered *Waverly* or *Pocono*. *X.*

Stemmatodus bicristatus, St. John. & Worthen, Geo. Sur. Ill., Vol. 6, 1875, page 331, plate 8, figs. 32 *a*, *b*, *c*; 33 *a*, *b*, *c*; 35 *a*, *b*, *c*. Small fish teeth found in the Subcarboniferous *Burlington limestone* of the Mississippi. *XI.*



Stemmatodus bifurcatus. St. John & Worthen, Geo. Sur. Ill., Vol. 6, 1875, page 330, plate 8, figs. 31 *a*, *b*, *c* (to be found on the same cut the preceding *S. bicristatus*), from the *Burlington limestone*. *XI.*

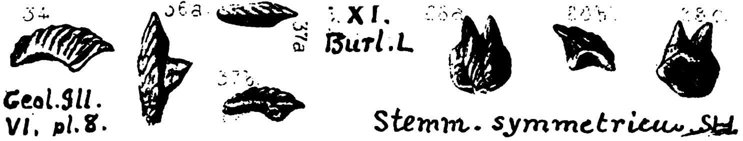
Stemmatodus cheiriformis, St. John & Worthen, Geo. Sur. Ill., Vol. 6, 1875, page 330, plate 8, figs. 29 *a*, *b*, *c*; 30 *a*,



b, *c; enlarged* figures of minute fish teeth found in the *Burlington limestone. XI.*

Stemmatodus compactus, St. John & Worthen, Geo. Sur. Ill., Vol. 6, 1875, page 334, plate 8, fig. 38 *b*, *d*, (placed on the same cut with the preceding *S. cheiriformis ;*) but found in the *Chester* (or *upper* Subcarboniferous) *limestone. XI.*

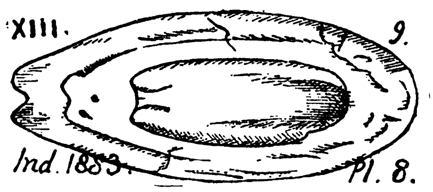
Stemmatodus simplex, St. John & Worthen, Geo. Sur. Ill., Vol. 6, 1875, plate 8, figs. 34; 36*a ;* 37 *a*, *b ;* small teeth found in the *Burlington limestone. XI.*



Stemmatodus symmetricus, St. John & Worthen, Geo. Sur. Ill., Vol. 6, 1875, page 333, plate 8, figs. 28, *a*, *b*, *c*, (placed on the same cut with the preceding *S. simplex.*) *Burlington limestone. XI.*

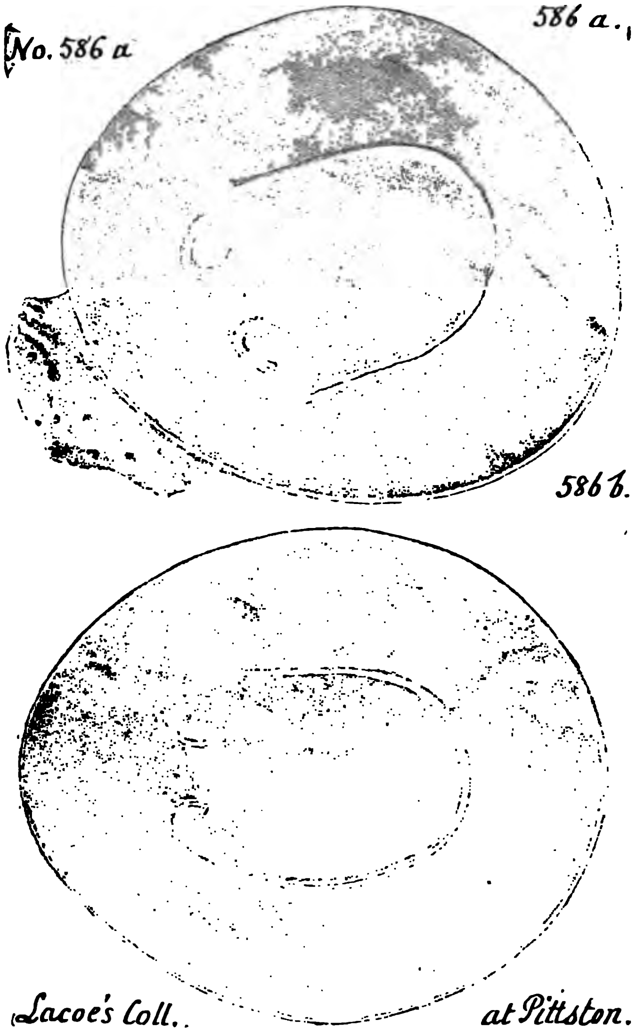
Stemmatopteris anceps. Lesq. Coal Flora, 1884, page 838. Uncertain new species made from two poor specimens, from Cannelton, Beaver Co., Pa., labelled No. 611, in Lacoe's collection at Pittston, Pa. *XIII.*

Stemmatopteris angustata. (Lesquereux, Coal Flora of Pennsylvania and the U. S., 1880, page 339, plate 59, fig. 3, Cannelton (Kittanning bed), Beaver Co. Pa.) Collett's Indiana Report, 1883, p. 74, plate 8, fig. 9, a leaf scar remarkable for its length and narrowness. *Coal measures. XIII.*



Stemmatopteris annulata, Lesqx. ined. Specimen No. 1118 of Lacoe's cabinet at Pittston, Pa., from the Wilkesbarre *anthracite coal. XIII?*

Stemmatopteris cyclostyga. Lesq. G. B. Simpson' drawings(1889) of specimens 586 *a*, *b*, in Mr. Lacoe's collection at Pittston, Pa.

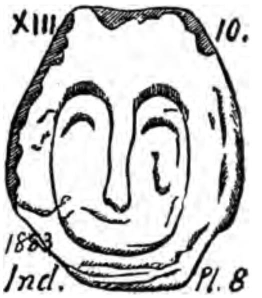


Stemmatopteris equilateralis, Lesq. inedit. Specimen No. 1046 in Lacoe's cabinet at Pittston, Pa., from *Kittanning coal* at Cannelton, Beaver Co., Pa. *XIII.*

Stemmatopteris mansfieldi, Lesq. from the *Cannelton* (*Darlington*) *bed* quoted by White (Q, 55). *XIII.*

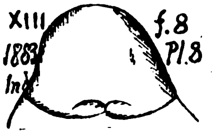
Stemmatopteris microstigma. Lesq. Coal Flora, 1884, page 338. New species, similar to *S. punctata*, but with scars only half as long, but of the same width. Spec. No. 612, of Lacoe's collection at Pittston, from Cannelton, Pa. *XIII.*

Stemmatopteris mimica. (Lesquereux. Coal Flora of Penn. and U. S., Report P. 1880, page 341, plate 59, fig. 4; remarkably mimicing a man's face with each of its leaf scars; from Mr. Mansfield's Kittanning coal bed at Cannelton, Beaver Co., Pa.) Collett's Indiana Report, 1883, p. 74, plate 8, fig. 10. *Coal measures. XIII.*

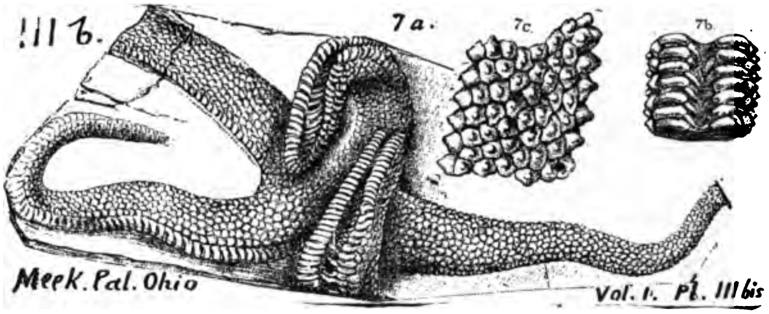


Stemmatopteris ovalis, Lesqx. inedit. Specimen No. 1045 in Lacoe's Cabinet at Pittston, Pa., from the *Kittanning coal* at Cannelton, Beaver Co., Pa. *XIII.*

Stemmatopteris polita. (Lesquereux, Coal Flora of Pa. Report P, 1880, page 342, plate 59, fig. 6, a small unsatisfactory fragment of the bark of a young tree (?), skin being very smooth and thin, from Kitt. coal at Cannelton, Beaver Co., Pa.) Collett's Indiana Rt. 1880, plate 8, fig. 8. *XIII.*



Stenaster grandis, Meek, Amer. Jour. Sc. and Art [3], Vol. 3, 1872, *Cincin. group*, Pal. Ohio, Vol. 1873, page 66, plate 3, *bis*, fig. 7 *a*, dorsal view; two of the rays folded over upon



the disc so as to show their ventral surfaces; another, curved and pressed sideways; the fourth and fifth with broken ends; 7 *b*, *enlarged* bit of a ray; 7 *c*, *highly magnified* bit of the dorsal side of a ray. (Under side of body not being visible a doubt remains that it belongs to Billings' genus; its rays are much longer and slenderer than his *S. salteri;* in this respect more like a species of the *Ophiuroidea*, but with the structure of the true *Astervidea.* Hall suggests that *Stenaster* should give way to McCoy's old *Urastella.*) Richmond, Ohio, *Cincinnati* (*Hud. riv.*) *upper beds. III b.*

Stenodactylus curvatus, *tracks.* Hitchcock, Ich. Mass., 1858, page 116, plate 20, fig. 11, outline of the usual position of a hind and a fore foot placed rarely less than an inch in advance of hind foot; plate 34, fig. 3, *reduced* sketch of the whole slab found at Turner's falls. *Trias.*

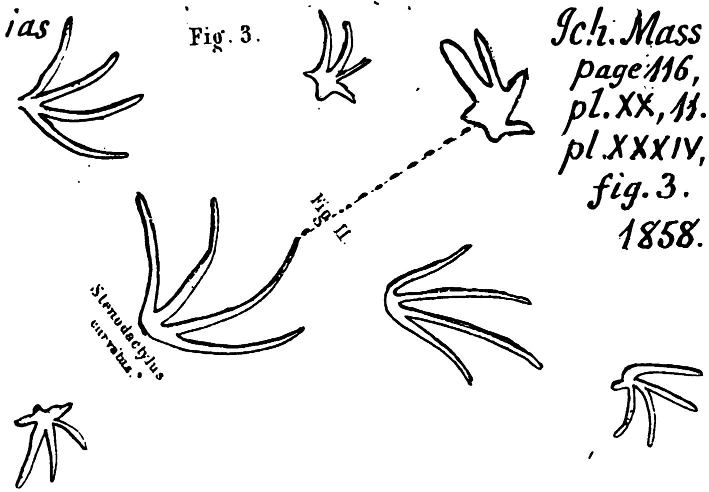
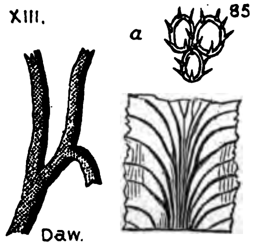


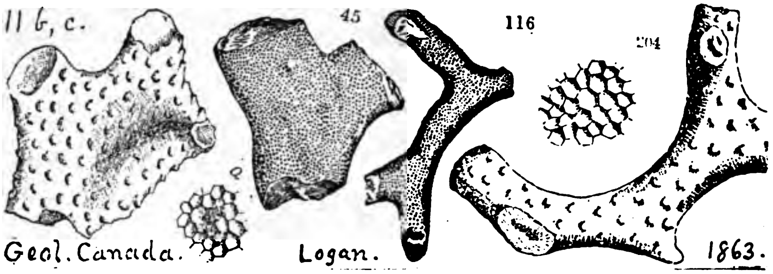
Fig. 3.
Fig. 11
Stenodactylus curvatus.

Trias

Ich. Mass
page 116,
pl. XX, 11.
pl. XXXIV,
fig. 3.
1858.

Stenopora exilis (*Ceriopora spongites*, Daw.) Acad. Geol. 287, f. 85 *a*, a delicate branching coral externally like, but structurally very different from *Calamopora macrothii*, King, of Permian age. Perhaps a polyzoan allied to *Helopora.* (*Daw.*) Very abundant in the *Carboniferous limestone*, (subdivision *d*) at Windsor, etc. Nova Scotia.—*XIII.*

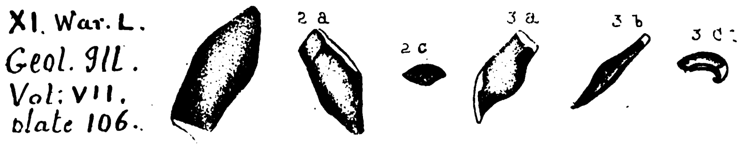




Stenopora (Monticulipora?) fibrosa, Goldfuss. (*Calamopora fibrosa.*) Geol. Canada, page 124, fig. 45, a specimen from the *chazy limestone;* page 156, fig. 116, a specimen from the *Trenton limestone;* page 206, fig. 203, 203*a*, 204, 204 *a*, varieties from the *Loraine shale*, with magnified portions of their surfaces. — *II b ; II c; III b.*

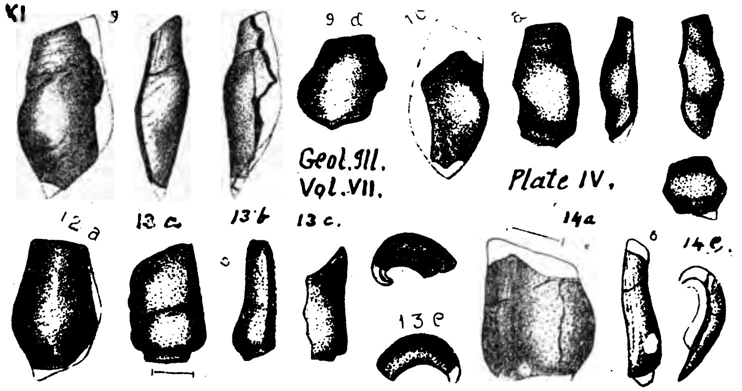
Stenopora petropolitana, Pander. Geology of Canada, 1863, page 156, fig. 117, a specimen from the *Trenton limestone formation. II c.*— [S. A. Miller notes that most of the species of *Stenopora* ought to be placed under *Monticulipora* as, e. g. *S.* (*M.*) *fibrosa*, above.]

Stenopterodus elongatus. St. John & Worthen, Geo. Sur. Ill., Vol. 7, 1883, page 106, plate 4, figs. 1 *a*, 2 *a*, *b*, *c*, 3 *a*, *b*, *c*. Small fish teeth found in the Subcarboniferous *Warsaw* limestone of the West. *XI.*

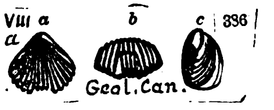


Stenopterodus parvulus, St. John & Worthen, Geo. Sur. Ill., Vol. 7, 1883, page 107, plate 4, figs. 4*a*, 5*a*, 6*a*, 7*a*, 8*a*, *b*, *d; enlarged* views of small fish teeth found in the *Subcarboniferous limestone* of the West. *XI.—See Appendix.*

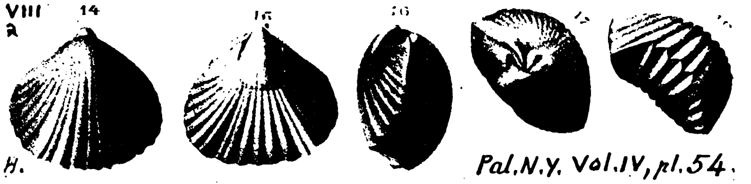
Stenopterodus planus, St. John and Worthen. Geo. Sur. Ill., Vol. 7, 1883, page 102, plate 4, figs. 9 *a*, *b*, *c*, *d*, *e* ; *10 a* , 11 *a*, *b*, *c*, *d ;* 12 *a;* 13 *a*, *b*, *c*, *d*, *e ;* 14 *a*, *b*, *c*, teeth found in the *Upper fish bed* of the *Burlington limestone* of the West. *XI.*



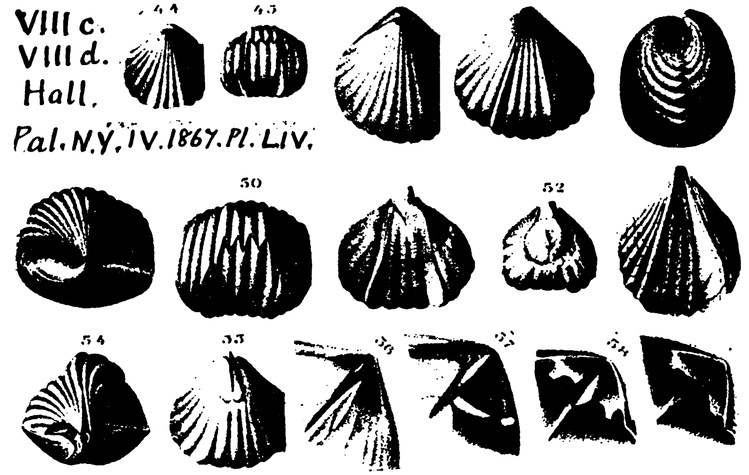
Stenoschisma billingsi, Hall, Pal. N. Y., Vol. 4, 1867. (*Rynchonella thalia*, Billings. Cana^{d}. Jour. 1860.) Geology of Can. 1863, p. 370, fig. 386 *a*, *b*, *c*, three views of a specimen from the *Upper Helderberg* (*Corniferous*) *limestone*. *VIII a.*



Stenoschisma (*Rhynchonella*) **carolina,** Hall. Pal. N. Y., Vol. 4, 1867, page 337, plate 54, figs. 14 to 18, dorsal, ventral, profile, cardinal and front views of a normal cast; 19, a less gibbous specimen. (See also Pal. Ohio, Vol. 1, 1873, page 196, plate 18, fig. 8*a* to *e*.) Shell partially preserved on only one of them; species different from all others in the *Corniferous limestone* by reason of its broad scarcely defined sinus, etc., etc. Near Columbus, Ohio.— *VIII a.*

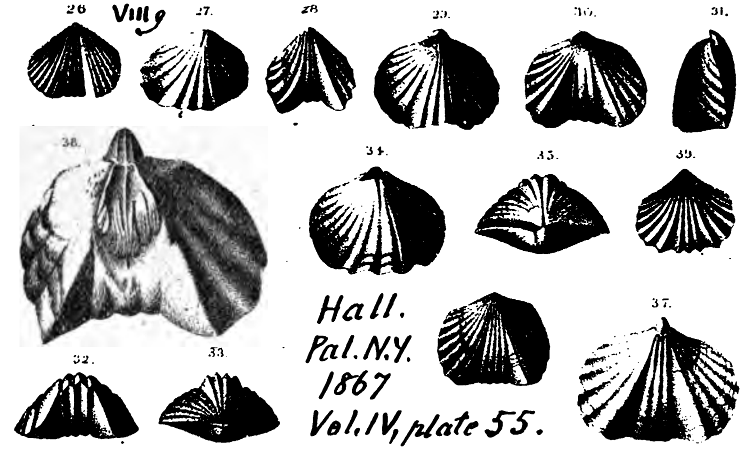


Stenoschisma (*Rhynchonella*) **congregatum,** (*Atrypa congregata*, Conrad, An. Rt. N. Y., 1841.) Hall, Pal. N. Y. Vol. 4, page 341, plate 54, figs. 44, 45, dorsal and front views of small round specimen; 46 to 50, views of a full grown and characteristic specimen; 51, 52, ventral casts, showing variable forms of muscle-scars; 53, 54, ventral and cardinal views of a long form, showing cavities where were dental lamellæ and hinge plate, also middle partition (septum) and filling of small triangular fissure in dorsal beak; 55, dorsal cast; 55, 57, *enlarged* hinges of dorsal casts, showing filling of beak cavities and fissure; 58, 59, *enlarged* artificial casts, made in natural molds of dorsal valves, showing hinge plate, dental sockets, median septum, and triangular fissures in different stages of development. Readily distinguished from *R. Sappho* by rounder form and ribs. Looks more like *L. Held. forms*, *e. g. R. pyramidata*. Some casts look like the *Chemung R. contracta*. — Conrad reported this (his *Atrypa congregata*) to be the most abundant fossil in the shales or limey sand beds of the *Hamilton* in various places of his district of N. Y., Unadilla Forks, etc. At Jinker's falls it is found in the *Tully limestone*. Hall found it in Erie Co., N. Y. — In Pennsylvania, specimen 868–1 (forty-seven) at Middletown quarry, and 869–5, 869-20, from Le Boeuff's quarry, Erie Co., both in *Panama conglomerate*. Also, from Northumberland Co., Pa., in White's collections one mile south of Selinsgrove (G7, p. 79; OOO p. 147) specimens 12,340, 12,258 from *Hamilton sandstone*; and in his own spec. 12,340 at Crawley Hill, Perry Co., from *Hamilton fossil ore*. *VIII c*.



VIII c.
VIII d.
Hall.
Pal. N.Y. IV. 1867. Pl. LIV.

Stenoschisma (*Rhynchonella*) **contractum.** (*Atrypa contracta*, Hall. Geol. 4th Dist., N. Y., 1843; Pal. N. Y., Vol. 4, page 351, plate 55, figs. 26, ventral; 27, dorsal; 28, ventral with only two folds in the sinus; 29 to 33, views of a characteristic specimen of ordinary size; 34, 35, cast, showing holes left by removal of hinge plate, teeth, septum, etc., 36, ventral, 4 folds in sinus; 37, cast of unusually large ventral valve; 38, *enlarged*, ventral cast (*Hamilton strata*, Onandaga Co., N. Y.);



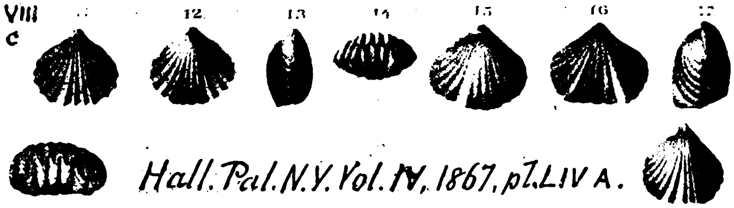
VIII g

Hall.
Pal. N.Y.
1867
Vol. IV, plate 55.

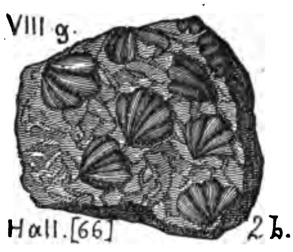
39, ventral valve from *Waverly sandstone* in Ohio. [Hence the species from *VIII g* to *X*.] (See Hall's remarks on p. 352, about its alliances.) — In Pennsylvania also from *Waverly* (*Pocono*) at Meadville, Crawford Co., and at Bradford, McKean Co., from *upper Chemung?* — (*Rhynchonella contracta.*) By this name quoted by White, as abundant in bed 2 of the Bloomsburg section, and beds 20, 23 of the Fiedler's creek section (G 7, pp. 290, 367; see specs. 12,270, 12,369, 12,377) *Upper Chemung.* — Perry Co., opposite Newport, Spec. 11,884; near New Bloomfield, Spec. 11,997, 12,002, 12,007, 12,217; and near Delville, Spec. 12,477, all in *Chemung.* — Bradford Co., near Lerov, Spec. 12,187, 12,203, *Chemung.* — Bedford Co., S. E. corner of E. Providence, with other *Chemung* forms in a sandstone (T2, 214); also at Liberty township, in a fossiliferous layer (bed No. 30, of the Saxton section, T2, 230) under the *Chemung lower conglomerate* (*Allegrippus*, 1550′ beneath the top of the formation.)—In the Warren collections.—In Erie Co., abundant in White's Upper Division of the *Chemung* (Q4, 118; abundant in the *Leboeuf* (*Panama*) *conglomerate* (White's *3d Oil Sand*, Q4, 110); most abundant form in its top layer, crowded with fossils at Doolittle's quarry (p. 107); scattered through shales up to the 2d Oil Sand (p. 104; predominates, finely preserved, in the *Spirifer bed over the 3d Oil Sand* at the Carroll quarry (p. 240), at Waterford (p. 269), at Doolittle's (p. 272); also in quarry on Big Brokenstraw just over the N. Y. line, Wayne township, considered by White sufficient proof of *3d Oil Sand* (p. 279); also at Lathrop's quarry, North East township (p. 298). — Reported by Carll abundant in *Third Mountain Sand*, (Report IIII, p. 273), which raises question of stratigraphy. — *VIII g*, *IX*, *X?*

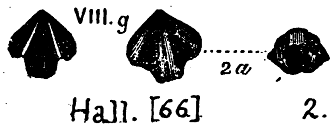
Specimens in the State collections: (OOO, 224) 854-47 (two; see Hall, Pal. N. Y., Vol. 4, plate 55, fig. 30-32.) Charleston, Tioga Co.; 856-6, -9 (see Hall's fig. 30), 856-18 (dorsal valve), -19 (ventral), -37, -38, -43 (dorsal), -46 (two) Mixtown, Tioga Co.; 858-5 (cast of dorsal valve), 860-33, -37 (two) Mansfield, Tioga Co.; 861-6, -9, 10, -14, -41, Sullivan, Tioga Co.; 870-17, -21 (two); 871-8, Salamanca, Cattaraugus Co., N. Y.; Spec. 886-2 (variety) Middletown, Bradford Co., Pa. — *VIII g.*

Stenoschisma dotis. (*Rhynchonella dotis.*) Hall. Pal. N. Y., Vol. 4, 1867, page 344, plate 54 A, figs. 11, 12, 13, 14 dorsal, ventral, profile and front views of medium size, with sharp plications; 15, 16, 17, 18, same of a broader form with rounded plications; 19, longer and higher mesial elevation. Differs a little from *S. prolifica.* Lime layer in *Upper Hamilton* on Lake Erie and in Genesee and Livingston Cos., N. Y. — In Pennsylvania, in Monroe Co., reported by C. E. Hall among the collections of 1875, at Marshall's falls, from *Hamilton strata.* *VIII c.*


VIII
c
12
13
14
15
16
Hall. Pal. N.Y. Vol. IV, 1867, pl. LIV A.

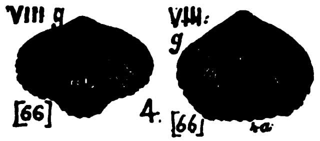
Stenoschisma duplicatum, (*Rhynchonella duplicata; Atrypa duplicata*) Hall, Geol. 4th Dist. N. Y., 1843, fig. on plate at end of volume, 67, 2, *a*, *b*. Two ribs in front and two on each side of the middle fold. — In Pennsylvania, found in



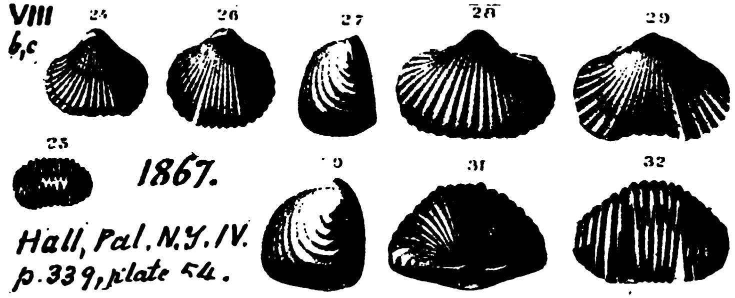


Charlestown township, Tioga Co. (OOO 223), Spec. 854-33, (in fair condition, as an example, J. Hall); 881-2b, from Bradford, McKean Co.— *VIII g.*—(*See Rhynchonella duplicata.*)

Stenoschisma eximium, (*Rhynchonella*, *Atrypa eximia*, Hall, Geol. 4th Dist. N. Y., 1843, plate 66, 4, *a*, *b*.)—Rogers' Geol. Pa., 1858, p. 829, fig. 682 *Chemung.*— Abundant, often in crowds, almost always without company of other fossil forms. (Hall.)—In Pennsylvania, Tioga Co., Charleston, Spec. 854-48 (doubtful); Big Shanty, McKean Co., 876-2*b;* Lycoming Co., W. line of Anthony township, 884-5, -6; Middletown, Bradford Co., 886-5; and at Warren, Randall's 9505, 9510, 9511, 9512, 9539, 9540, 9541, 9584, 9585, 9586, 9588. *VIII g.*



Stenoschisma horsfordi. (*Rhynchonella horsfordi*, Hall· 13th Regts. Rt. 1860. *Corniferous*, *Marcellus* & *Hamilton.*)—Hall, Pal. N. Y. Vol. IV, 1867, page 339, plate 54, fig. 24, dorsal shell of medium size; 25, front of a smaller specimen; 26, 27, dorsal and profile of a rounder one; 28 to 32, views of a large well formed and characteristic specimen. Differs from the usually larger *S. sappho*, in having more, finer and sharper plications; never abundant; often crushed and distorted; in the *Hamilton & Marcellus* of New York.—In Pennsylvania, Perry Co., Newport Narrows, Claypole's Spec. 12,246; Barnetts mill, Spec. 11699 (four); Brickfield, Spec. 12,488 (three); all

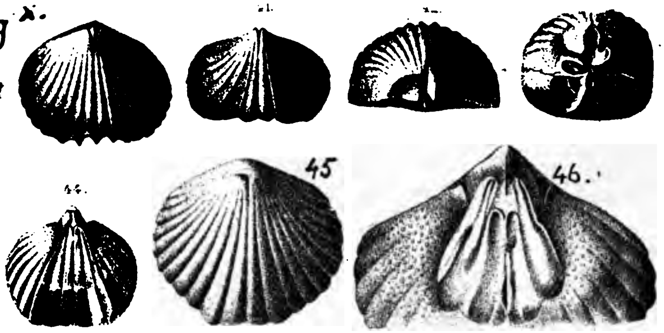


1867.
Hall, Pal. N.Y. IV.
p.339, plate 54.

Hamilton upper slates.— Huntingdon Co., Coffee run (T3, 112) Spec. 12,725, *Hamilton lower shale.*— *VIII a; VIII c.*

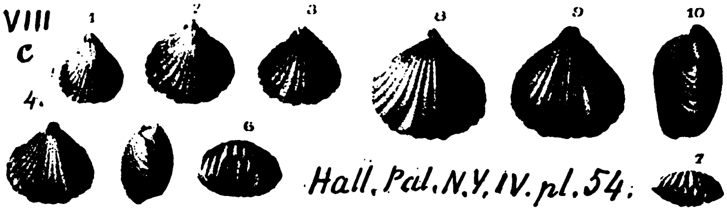
Stenoschisma (*Rhynchonella*) **orbiculare**, (*Rhynchonella orbicularis*, Hall. 13th Annual Rt. 1860, *Chemung.*) Hall, Pal N. Y., 1867, Vol. IV, page 353, plate 55, fig. 40, dorsal cast, irregular filling of fissure of hinge plate; 41, dorsal cast; 43, ditto, hinge plate, teeth, etc., removed; 44, ventral view of cast; 45, large dorsal cast (from Chautauqua, N. Y.); 46, *enlarged*, ventral cast; all but one from Meadville, Pa. *Waverly* or *Pocono strata.*— In Pennsylvania, collections by Sherwood; and Carll. Collected by Hicks at Big Shanty, McKean Co. (OOO, 242) Spec. 876 - 2*a*. *VIII* to *X*.

VIII g Hall, Pal. N.Y. 1867, Vol. IV, p. 353 plate 55.



Stenoschisma prolificum. (*Rhynchonella prolifica.*)

VIII c

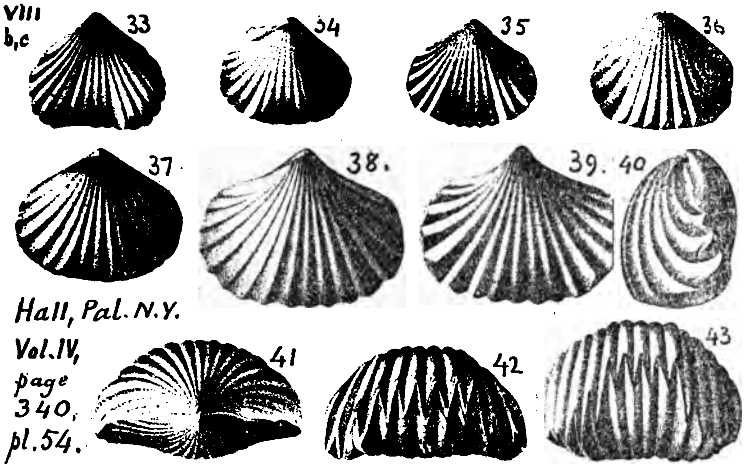


Hall, Pal. N.Y. IV. pl. 54.

Hall. Pal. N. Y., Vol. 4, 1867, p. 343 pl. 54A, fig. 1 to 10; known by slender, angular ribs, edge of sinus curved up in front, and nearly straight beak. Abundant in *Ham. shales*, Fultonham, Schoharie Co., N. Y. (mostly casts of interior) and elsewhere. Young (?) abound at Moscow, York, etc., Western N. Y.— In Perry Co., Pa., Drumgold's tannery, Claypole's four Specs. 12,386, from *Ham. SS.* and *upper slates.*—In Huntingdon Co., three specs. 12,746, bottom beds of *Hamilton middle slates.* (T3, p. III.)— *VIII c.*

Stenoschisma sappho. (*Rhynchonella sappho.*) Hall, Pal.

VIII
b,c

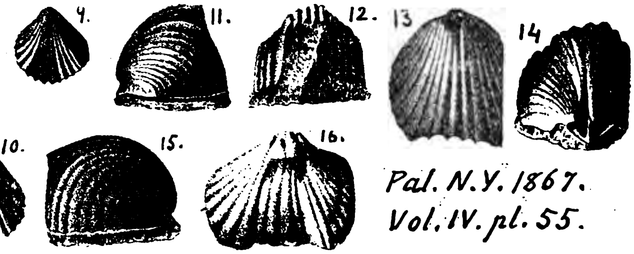


Hall, Pal. N.Y.
Vol. IV,
page
340,
pl. 54.

N. Y. Vol. 4, page 340, plate 54, fig. 33, *doubtful* ventral valve found in *Upper Helderberg* limestone; 34, 35, medium size specimens; 36, 37, two dorsal valves to show variation of outline; 38 to 42, a large characteristic specimen; 43 a still larger, fatter one. Young shells have 14 or 15, adult ones 22 to 24 plications; fine concentric thread-like raised lines, often shown also in casts; differs from *S. horsfordi* in its robuster form and stronger plications; may be compared with the European *Devonian Rhynchonella flexistria* (*tumida*) Phillips. Leroy, Genesee Co., N. Y., in *Marcellus lime shales;* Geneseo, and York, Livingston Co., and on Lake Erie, in *Hamilton shale.* — In Pennsylvania, Tioga Co., Charleston township (OOO, p. 221), Sherwood's Spec. 854–17, –21 *b*, –34 (eight in all), identified by J. Hall, 1889. — Spec. 870–4, Salamanca, Western N. Y., collected by Ashburner, from shales *above* the *Sal. conglomerate;* Specs. 871–3 *a*, 4 *a*, were got at a horizon somewhat *below* the conglomerate. (Note. — 871–3 *a*, a good ventral valve may be a variety.) — Spec. 880–2 *b* (a variety ?) and 882–3, Hicks' collections on Kinzua creek, near McKean Co. line, Pa., in *Chemung.* — Spec. 883–82 *e* (OOO, p. 247), in R. Howell's collection's at Nichols, Tioga Co., N. Y. *Chemung. VIII g.* — In Columbia Co., Pa., on Little Fishing creek, White collected it, however, from *Hamilton shale*, 250′ below the top of *VIII c* (G7, pp. 75, 229); and in Huntingdon Co. on Coffee run in *Hamilton upper shale* (T3, p. 171). *VIII c.*

Stenoschisma stephani (*Rhynchonella* *stephani*,) Hall.

VIII g.
Hall.

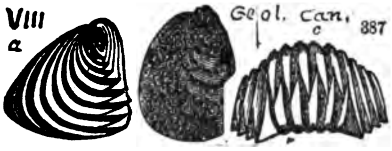


Pal. N.Y. 1867.
Vol. IV. pl. 55.

Pal. N. Y. Vol. 4, 1867, page 349, plate 55, figs. 9, young ventral valve; 10, large ventral cast; 11, 12, a cast, with narrow angular plications; 13, 14, 15, dorsal, hinge and profile; 16, ventral cast with muscular impressions. The casts show the short dental plates in ventral valve, and strong long partition in dorsal valve. Remarkably like *R. eximia*, but outline more angular and plications coarser. Near Ithaca, N. Y., (found with *R. eximia*) ; Phillipsburg, Allegheny Co., N. Y., also Cortland, Co., N. Y. — In Pennsylvania, near Bedford, collected by Dr. R. S. Stevens. — Also, in Fayette and Westmoreland Cos., found by Stevenson in the Devonian rocks which rise from the river beds to arch in the gaps (K3, p. 311). *Chemung*, *VIII g*.

Stenoschisma tethys, Billings (*Rhynchonella tethys*, Billings, Canad. Journal, 1860. Geol. Canada, 1863, page 370, fig. 387 *a*, *b*, side views of two diferent specimens; *c*, front view. *Corniferous limestone*, *VIII a*.

VIII
a



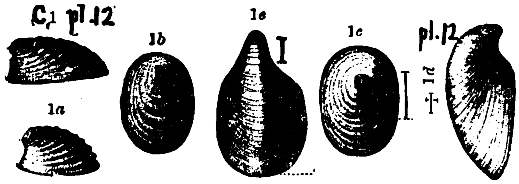
Stenodactylus curvatus, Hitch. Ich. Mass., 1858, page 116.

Stenotheca. A genus of *Pteropods* established by Hicks, Quar. J. Geol. Soc. London, 1872.—Billings described *S. pauper* from the *Huronian strata* of Canada, Pal. Foss. Vol. 2, 1874. —*Discina acadica* of Hartt, from the *St. John rocks*, is now *Stenotheca acadica*.—Hall's *S. rugosa* was found by Ford in the *Georgian* beds at Troy, N. Y.—Walcott saw in Ford's collection compressed specimens closely resembling *D. acadica*, Hartt. Whitfield had called attention to this resemblance in Bull. Am. Mus. N. H. N. Y. Vol. 1, p. 140, believing Ford's fossil to be the impression of a univalve *Palæacmea* or *Stenotheca*. (Walcott, Am. J. S. Feb. 1885, p. 117.)

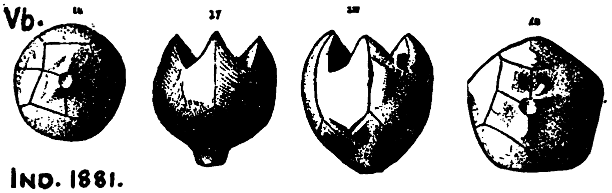
Stenotheca elongata, Hicks, placed by Walcott among gasteropods. United States Geol. Survey, Bull. No. 30, 18 page 125.

Stenotheca pauper. See **Stenotheca rugosa,** *L. C.*

Stenotheca rugosa. (*Metoptoma? rugosa*, Hall, 1847, Pal. N. Y. I, p. 306, plate 83, figs. 6a to 6c. — *S. rugosa*, Billings, 1872. Can. Nat. Vol. 6 p. 479, — *S. pauper*, Billings, l. c) Walcott, Bulletin No. 30, U. S. G. S. page 128, plate 12, fig. 1, side view, middle sized; 1*a*, side view, more elevated, coarsely ringed; 1*b*, 1*c*, top views to show eccentricity of axis; 1*d*, 1*e*, side and top of very small shell. All from Troy, N. Y. Found also near Quebec; Straits of Belle Isle; Newfoundland — *Lower Cambrian* (*Georgian*) *formation. L. C.*



Stephanocrinus gemmiformis, Hall. Pal. N. Y. Vol. 2, p. 215, pl. 48, fig. 2; 28th An. Rt. Museum edition, 1879, p. 146, pl. 14, figs. 15, 20; also in Colletts's Indiana Report of 1881, page 279, plate 13, figs. 16 to 20, the specimens being larger and rounder than those found in the New York *Niagara shales. Vb.*

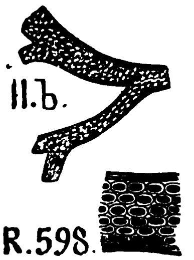


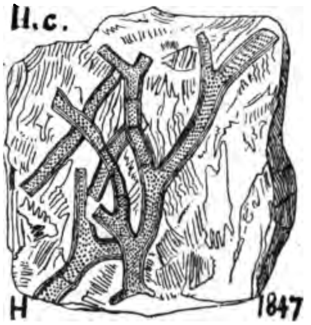
Sternbergia, the pith of **Dadoxylon,** which see for Dawson's figures *in Appendix.* — See **Cordaites serpens.** *XIII.*

Stethacanthus altonensis (*Physonemus altonensis*, St. John & Worthen. G. Sur. Ill. Vol. 6, plates 18, 19) Newberry Pal. Fishes of N. A. 1889, p. 196, plate 24, fig. 1, 2, *nat. size*, from St. Louis limestone, Alton. XI.

Stethacanthus tumidus, Newberry. Pal. Fishes of N. A. Monograph 16, U. S. G. Survey, 1889, page 198, plate 25, fig. 1, *nat. size;* 2, ½ *size*, spine *with fin attached*, side view, slightly restored from impression in shale over *Berea grit;* 2 *a*, edge of same seen from above. Fifty of these spines were found by Dr. W. Clark at Berea, Ohio. Spines 6″ to 10″ long; concave in front (not in rear); unsymmetrical; probably paired, i. e., not central dorsal spines, but pairs of pectoral or ventral spines, probably pectoral because we have palæozoic pectoral shark's spines (*Gyracanthus* and *Machæracanthus*) and innumerable examples among living fishes, while ventral spines are almost unknown. (Newberry). *Berea grit* (*Pithole grit, First Butler Oil Sand*, over *First Venango Oil Sand* of W. Pa.) Middle of the Ohio *Waverly;* near bottom of the E. Pa. *Pocono. X.—For figure see Appendix.*

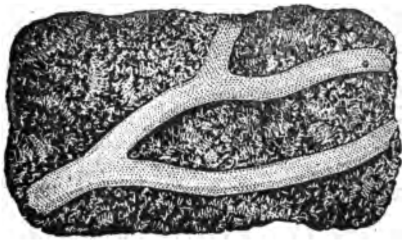
Stictopora acuta. Rogers, Geol. Pa., 1858, page 818, fig. 598. *Trenton.* (Hall, Pal. N. Y., Vol. 1, 1847.)—In Pennsylvania, Centre Co., Bellefonte, (O O O, 177) Spec. 203–8 A (a beautiful specimen), Spec 210–121 *b* (a good specimen), 210–142. *Trenton limestone. II c.*





Stictopora bifurcata. (*Eschara bifurcata.* MSS. of Van Cleve.) Collett's Indiana Report of 1882, page 267, plate 13, fig. 3; fig. 4 a fragment of the frond *enlarged.* (Arrangement of pores at bifurcation in both figures not strictly accurate. Collett.) — Dayton, Ohio. *Clinton, Va.*

3



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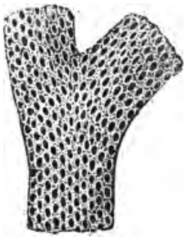
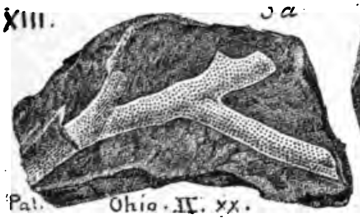
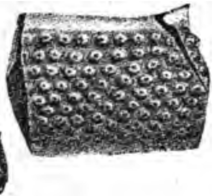


Stictopora carbonaria. (*Ptilodictya carbonaria*, Meek Proc. Acad. N Sc. Phila. 23, 160.) Pal. Ohio, Vol. 2, 1875, page 328, plate 20, fig. 3*a*, *nat. size*, imperfect specimen; *b*, *magnified* pores of a portion of a branch; entire size unknown; seems to agree nearest with Hall's *Niagara S. punctipora*, especially in its round pores with raised margins, and in the number and order of pores, but differs in having its sharp side margins smooth instead of striated. It differs from *S.* (*Ptylodictya*) *gilberti*, Meek, of the *Corniferous*, in having long ridges between the rows of pores, — Newark, O. *Coal measures.* XIII.

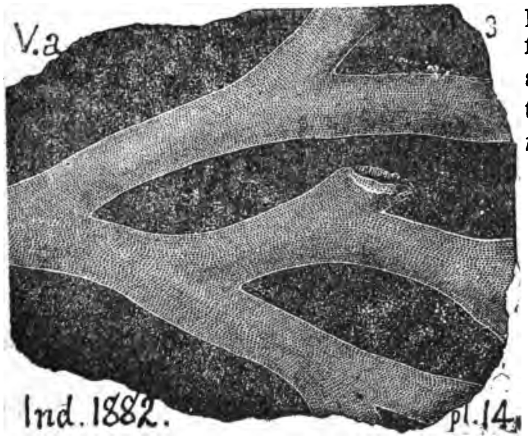


XIII.

Pal. Ohio. II. XX.



Stictopora compressa. Collett's Indiana Report of 1882, page 267, plate 14, fig. 3, showing size, and growth. Dayton, Ohio. *Clinton formation.* *V a.*



V.a

Ind. 1882. pl. 14.

Stictopora elegantula, Hall, Pal. N. Y. Vol. 1, 1847, p. 16, plate 4, figs. 4 *a*, *natural size* of the branches of the coral; *b*, *magnified;* *c*, another specimen from a different locality; *d*, *magnified* piece of ditto; *e*, part of the axis of a specimen denuded of its outer crust, showing concentric lines of pro-

II b. Ch. II c. Tr.

Hall. Pal. N.Y. Vol. 1. p. 16. plate 4.

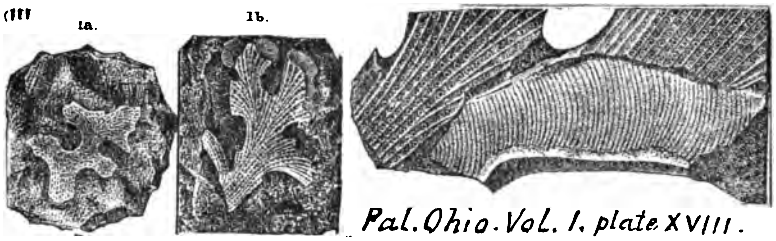
gressive growth; cellules in perpendicular rows separated by ridges and cross-bars; specimens differently worn look as if they might be of different species. Occurs in the lower beds of the *Chazy*, at *Chazy* and Galway, N. Y., associated with *crinoidal joints*, *Leptænæ*, etc. Specimens from *Birdseye limestone* may possibly be the same species; but those from the *Trenton limestone* are very different. (Hall.) —In Pennsylvania, Huntingdon Co., Nearhoff's quarry, near Tyrone forges, Fellows' spec. 213–3 (doubtful.) Also reported by C. E. Hall from Kishicoquillis valley, Mifflin Co., Pa. *II b; II c?*

Stictopora fenestrata. (Hall, Pal. N. Y. Vol. 1, 1847, *Chazy.*) *Sulcopora fenestrata.* Emmons, Amer. Geol. Vol. 1, part, 2, 1855, page 206, plate, 3, f. 5, *a*, *b*, cellules in rows, separated by a furrow lengthwise of axis of support, mouths oval or rounded. *Chazy formation. II b.*

S. fidelis, Ulich, 14th Rt. Minn. 1886. *II c.*

S. fruticosa, Hall, 1881. *VIII a.*

Stictopora gilberti. (*Ptilodictya gilberti*, Meek. Proc. Acad. Nat. Sci. Philada. 1871, *Cornif. lime.*) Pal. Ohio, Vol. 1, 1873, page 194, plate 18, fig. 1 *a*, *natural size*, a piece lying in its matrix; 1 *b*, another specimen; 1 *c*, a *much magnified* fragment of one of the branches, showing pores with slightly raised margins, and ridges between rows; also the cross-scratched lamina, or axis, exposed by the removal of the porous part of that side; also (at *i*) the impression of the opposite porous side made in the matrix. — In Pennsylvania, Spec. 867–2, collected by J. H. Dewees in 1877 from a fossiliferous limestone 400′ down from the top of the *Chemung formation* near Newport Perry Co., (mislabeled *Ptilopteria*) shows several hundred impressions. In Monroe Co., Marshall creek specimens 804–24, -101, are from *Hamilton rocks.*—In Blair



Pal. Ohio. Vol. I. plate XVIII.

Co., Bell's Mills specimen (poor) 805–6, collected by C. E Hall from *Hamilton rocks.*—It ranges therefore from *VIII a* to *VIII g.* — Fig. 2 is a part of specimen from Lucas county, O., nearly 5 inches long by 2 wide, over and beyond which a bryozoon spreads, and split so as to show one side of the strongly wrinkled and striated axis, possibly of *S. gilberti*, but probably of some allied species, to which in that case the name *S. lichenoides* might be given. *III b.*

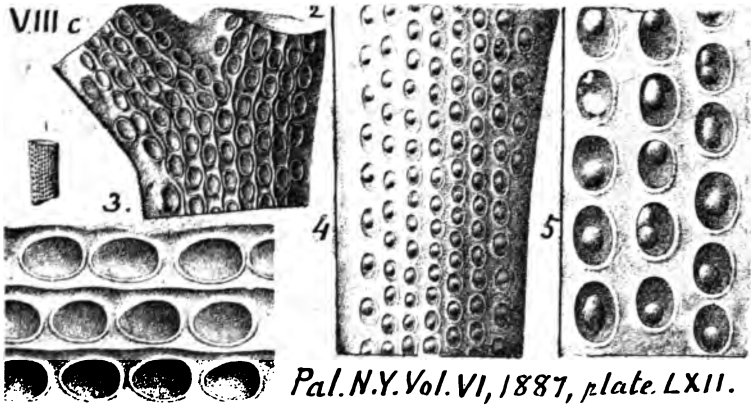
S. glomerata, Hall, Pal. N. Y. Vol. 1, 1847. *II b.*

S. granulata, Hall, Pal. Vol. 6, 1887. *VI.*

S. granifera, Hall, Report of 1884. *VIII c.*

S. incisurata, Hall. The same. *VIII c.*

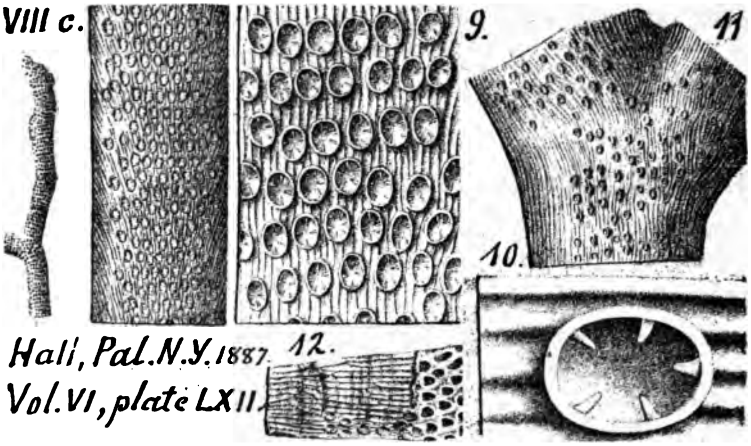
Stictopora incrassata, Hall. Trans. Alb. Inst. 1881; Report for 1883; Pal. N. Y. Vol. VII, 1887, page 249, plate 62, fig. 1, *natural size*, fragment; 2, 3, *enlarged six* and *eighteen times;* 4, *enlarged six times*, to show the little knobby doors (nodular opercula), closing the mouths of the cells; 5, *enlarged 18*, ditto; (6, omitted, oval cross section). From Ontario Co., Canada. *Hamilton formation. VIII c.*



Pal. N.Y. Vol. VI, 1887, plate LXII.

Stictopora interstriata, Hall. Trans. Alb. Inst. 1881; State Report for 1883; Pal. N. Y. Vol. 6, 1887. page 259, plate 62, fig. 7, *natural size* of fragment; 8, *magnified 6 times;* 9, *eighteen times;* 10 *seventy times*, to show the spiniform projections from the interior in each of the cells; 11, *enlargement six times* of a fork of a frond, showing many striations lengthwise obscuring the cell apertures; 12, *same enlargement*, showing the skin (epitheca) marked by recumbent portions of cell tubes, the upper part giving the aspect of a macerated frond.

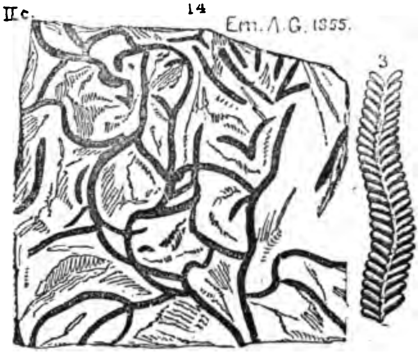
VIII c.



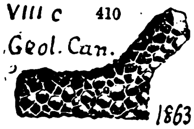
Hall, Pal. N.Y. 1887
Vol. VI, plate LXII

(Figs. 7 to 10, from Ontario Co., 11, 12 from Erie Co., N. Y.) *Hamilton formation. VIII c.*

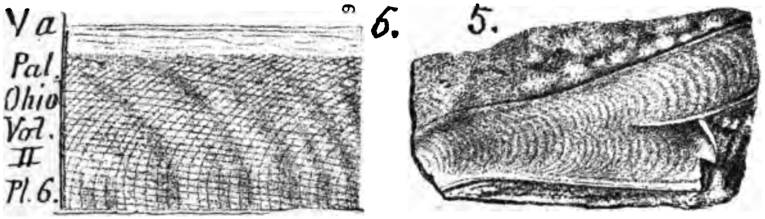
Stictopora labyrinthica. (Hall, Pal. N. Y. Vol. 1, 1844, Birdseye limestone.) *Ptilodyctia labyrinthica*, Emmons, American Geology, Vol. 1, part 2, page 205, plate 4, figs. 14, 18, 22 and 3; flattened, bending, branching stems, with oval cells on both faces. Abundant on the weathered surface of *Birdseye limestone beds*, at Chazy, N. Y. *II c.*


II c.
14
Em. A. G. 1855.
3

Stictopora linnæana, Billings. Geology of Canada, 1863, page 383, fig. 410. *Hamilton formation. VIII c.*



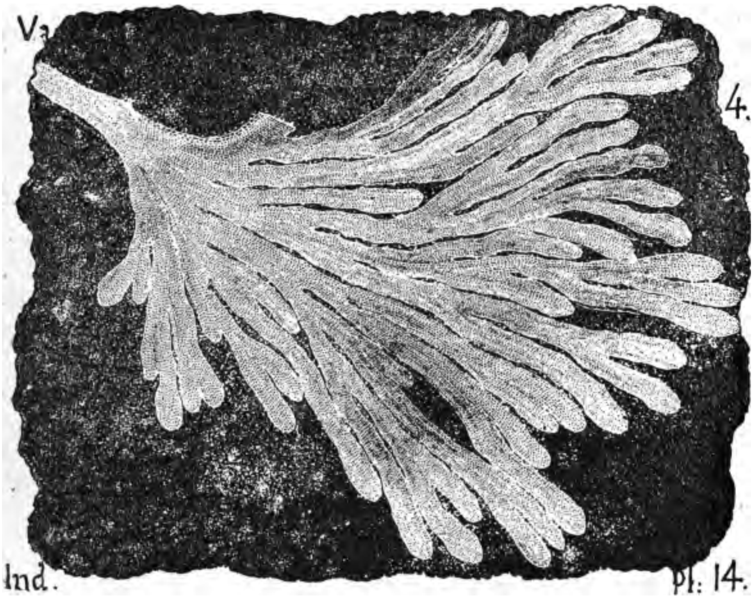
Stictopora magna, Hall and Whitfield. Pal. Ohio, Vol. 2, 1875, page 112, plate 5, fig. 5, fragment of stipe split through the center, showing inner face of laminæ; 6, *enlarged* lines of

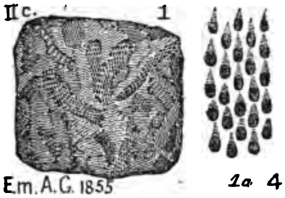


cells, as exposed on outer surface. Dayton, O., *Clinton formation. V a.*

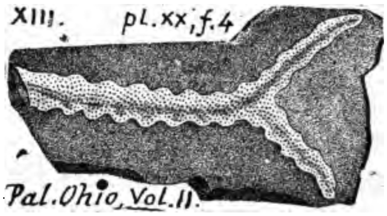
Stictopora meekii. In Pennsylvania, Perry Co., Penn ridge, Spec. 11,891; Soap hill, 12,220; both from *Chemung;* also Junkin's farm, 12,051; Shermandale mill, 12,139; both from *Chemung-Catskill.* (Spec. 12,473 is a type specimen sent by Prof. H. S. Williams of Ithaca). *VIII g; VIII-IX.*

Stictopora multifida. Collett. Indiana Report of 1882, page 268, plate 14, fig. 4. a large and apparently nearly entire frond; showing close and frequent branching and longitudinal arrangement of the pores. Dayton, Ohio, *Clinton yellow limestone. V a.*



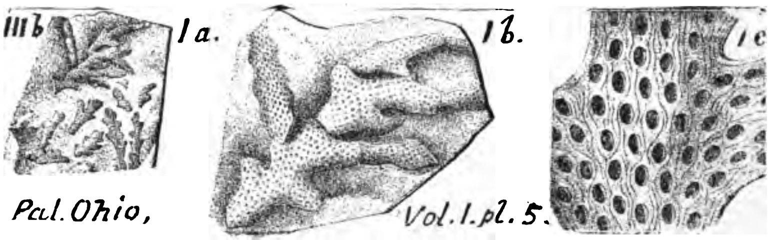


Stictopora ramosa. (Hall, Pal. N. Y. Vol. 1, 1847, Birdseye limestone). *Ptilodyctia ramosa*, Emmons, Am. Geol. Vol. 1, ii, 1855, 205, plate 4, figs 1, 1 *a;* crusted on both sides with cells in parallel lines, and oval oblique mouths. *Birdseye limestone.*

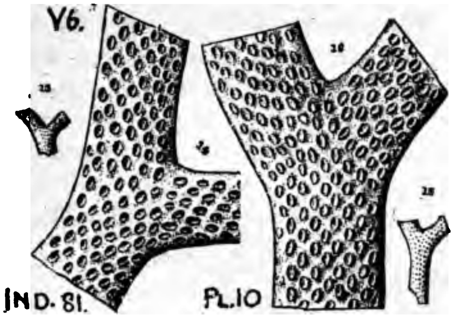


Stictopora serrata. (*Ptilodictya serrata*), Meek. Pal. Ohio, Vol. 2, 1875, page 327, plate 20, fig. 4, *natural size*, a portion showing the sawtooth edges of this bryozoon, the length to which it grew being unknown, but differing from all others by numerous, very short, regularly and closely arranged, blunt or square-cut side-divisions given off at right angles from both edges of both stem and branches; not broken off; the pores continuing out into them without any change. Flint ridge, O., *Lower coal measures. XIII.*

Stictopora shafferi.. (*Ptilodictya shafferi*, Meek. Proc. Acad. N. S. Phila. Feb. 1872, p. 317). Pal. Ohio, Vol. 1, 1873, page 69, plate 5, fig. 1 *a*, *natural size*, parts of stem and branches; 1 *b*, *magnified 2½ times*, ditto; 1 *c*, *magnified 12 times*, a part of a branch, showing the oval pores, and striated spaces between them; size of growth unknown; readily distinguished from other Silurian bryozoa by its delicate smallness, peculiar plumy growth, and wavy line ornamentation between the pores, which are far more numerous than in Hall's delicate little New York *S. raripora*. Cincinnati. Lower part of *Hudson river formation. III b.*



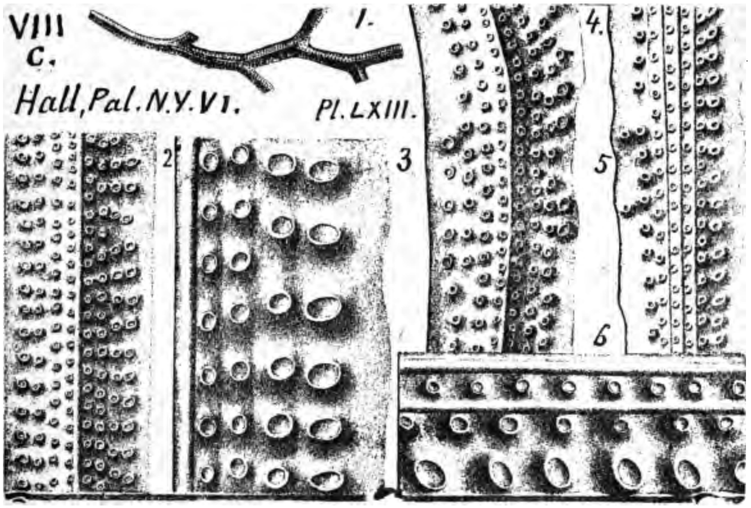
Stictopora similis, Hall, in Collett's Indiana Report of 1881, page 247, plate 10, figs. 13-16. *Niagara formation. V b.*



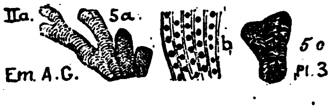
S. sinuosa, Hall, 1884, *VIII c.*

S. striata, Hall, 1887, Pal. N. Y. VI.—*VIII c.*

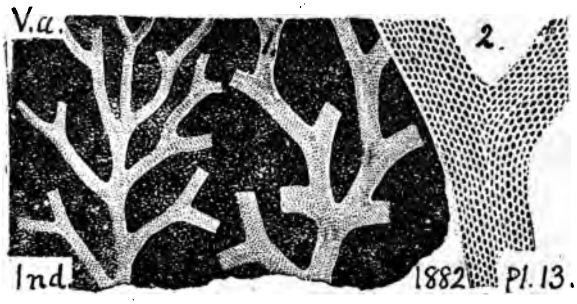
Stictopora subcarinata, Hall. Trans Alb. Inst. X, 1881. Pal. N. Y. Vol. VI, 1887, page 261, plate 63, figs. 1, *natural size*, a fragment; 2, *enlarged 6 times;* 3, *enlarged 18 times*, to show more plainly the character of the mouths of the cells; 4, *enlarged 6 times*, fragment of a flatter form and less regular cell arrangement; 5, *enlarged 6 times*, fragment showing striations or ridges between the cells; 6, *enlarged 18 times*, to show these plainer. Yates and Genessee Cos., N. Y. *Hamilton.*—In Pennsylvania, found by C. E. Hall at Bell's Mills, Blair Co. See Spec. 805-11, -17 (poor impression), Catalogue OOO, p. 215, from *Hamilton shale. VIII c.*—Note. S. A. Miller makes this a synonym of **Tæniopora subcarinata.** (N. A. Geology and Palæontology, 1889, page 325.



Stictopora tenestriata. Emmons, American Geology, Vol. 1, part 2, 1855, plate 3, figs. 5a, 5*b*. 5c.—NOTE. Recognized as Hall's by S. A. Miller. N. A. G. and P, 1889.



Stictopora vanclevii. Collett. Indiana Report of 1882, page 268, plate 13, fig. 1, showing the size and mode of growth of two separate fronds on the same stone; fig. 2, a *magnified* piece of one of them. This is not Hall's *Stictopora ramosa.* (Collett.) Dayton, *Va.*



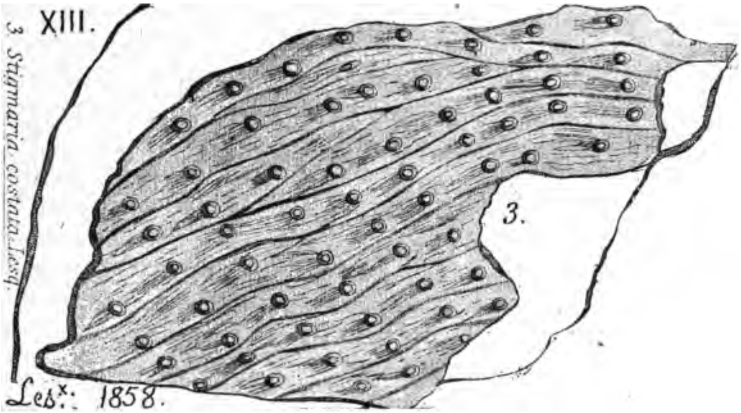
Stictopora —— ? Spec. 203-46; 210-116 *d* (good; fragments of others, poor); 210-135 (thirteen specimens, very good); 211-4 *b* (very good); all from *Trenton. II c.*

Stictopora, in Huntingdon Co., Pa., are numerous in bed 4 of McConnellstown section, and at Crooked creek crossing (T3, 199, 211) in *Hamilton upper sandstone.* Also, at Cove Station, and in beds 5 of Mapleton section (just under *Tully ? limestone*) in *Hamilton upper shales* (T3, 107, 273).—See also in Perry Co. Drumgold's tannery, Spec. 12,416, from *Ham. upper shales.* — *VIII c.*

Stictopora, very abundant in Juniata river section, bed 8, 250 feet beneath *Chemung lower* or *Allegrippus conglomerate* (one of the *Stony Brook beds* of G7), T3, 193.—In Columbia, Montour and Northumberland Cos., found in beds 14, 17, 19, 21, 24, 26, 30, 38 of the Rupert section (G 7, 68, 69); in bed 103 of the Catawissa section (p. 240); abundant (p. 241); in beds 46, 47, 48, 50, 53, 55, 68 of the Bloomsburg-Catawissa section, beginning near bed 69 they occur in vast numbers, every few feet of this section, for 800 feet, up to bed 45 (G7, 287, 289); in beds 5, 7, 9 of the Bloomsburg section (p. 290); at South Danville (p. 351).—In Northumberland Co., Shamokin township, a small *Stictopora* is the most abundant form in the *Lower*

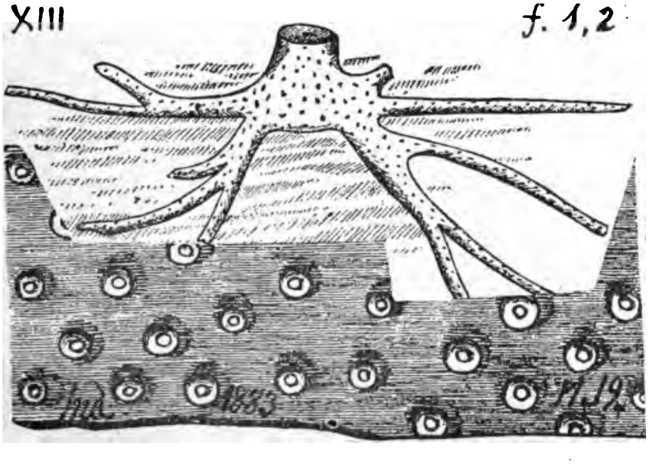
Chemung, prevailing universally in the sandy beds, from 600′ to 1200′ or 1400′ above the base of the formation (G7. 356); in bed 2 of the Selinsgrove section (p. 359); in beds 43, 45, 46, of the Fiedler's creek section (p. 367). — *VIII g.*

Stigmaria costata. Lesq. Geol. Pa., 1858, p. 870, plate 2, fig. 3; from Salem anthracite vein at Pottsville; may have been broken from the base of a *Sigillaria regularis*, Brgt. It differs from *Stigmaria anabathra*, Corda, by its nearly regular strong raised ribs between the rows of scars. — *XIII.*

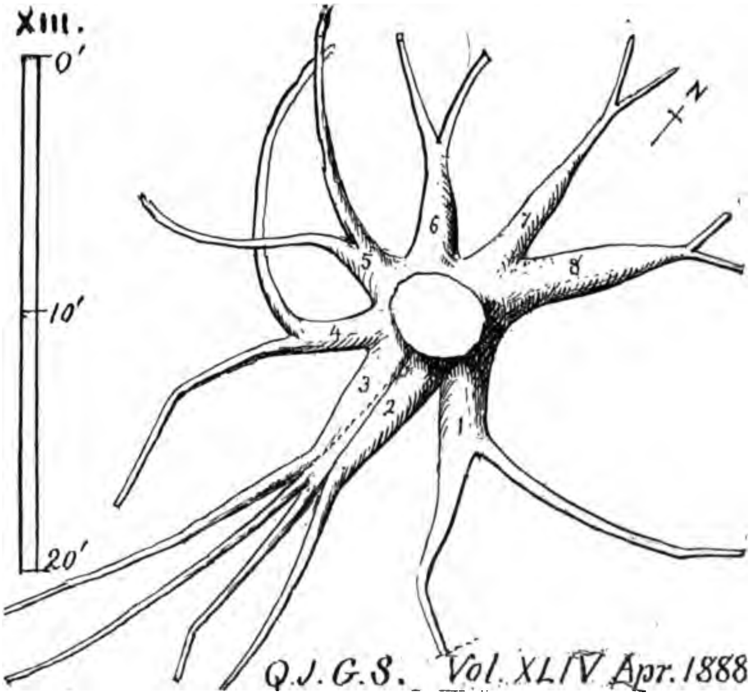

3 XIII.
3 Stigmaria costata Lesq.
3.
Lesx: 1858.

Stigmaria exigua. Dawson, Geol. Sur. Canada, Foss. plants, plate 3, fig. 30, "possibly a branch of Cyclostigma," Elmira, N. Y. (Coal Flora, page 843. — *VIII g.*

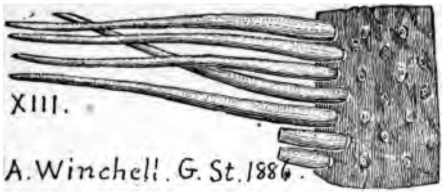
Stigmaria ficoides. (Brongniart, Class. Veg. Foss. 1822, Pl. 1, f. 7; Lind. & Hutt. Foss. Fl. plates 31 to 36; Sternberg; Flor. d. Vorw. 2, pl. 15; Corda, Beitr. pl. 12,



13; Gein. pl. 11; Goepert's Permian Flor. pl. 34 to 36; Gold. 3, pl. 11 to 13; Lesquereux Geol. Pa. 1858; Illinois Rt. 2; Schimp. 2, pl. 69; — *Variolaria ficoides, St.; Ficoidites furcatus,* and *Fic. verrucosus, Artis; Fytolithus verrucosus,* Martin, Petrif. Derb.; Parkins, Organ. Rem.; Steinhauer. Trans. Am. Phil. Soc. Phil. Vol. 1, p. 268, plate 4, f. 1 to 4; and others given in a note by Lesquereux, Coal Flora of Pa., Report P. 1880, page 514, plate 74, figs. 1, 11, 12, 13.) Collett's Ind. Rt. 1883, plate 19, fig. 1, very reduced; fig. 2. — *XIII. Coal measures.* NOTE. — Collett says that he has traced the impress of stems, on the surface of a fine-grained sandstone stratum in Pennsylvania, 200 feet or more, without diminution of their thickness, except where they fork, which happens rarely. Leaves also, one or two feet or more long, always simple and of equal width; rarely ending in a large oval swimming bladder. — Several noble *Stigmaria* roots have been carefully mined out by English colliery owners and presented to museums. The last one is described in the Quar. Jour. Geol Soc. London,



No. 175, 1883, page 375, with a ground plan as shown in the figure. It was got at Clayton quarries Yorkshire; and is now in the Bowling Public Park. — I have borrowed a curious figure from Prof. A. Winchell's admirable work entitled "Geological Studies," published in 1886, page 420, fig. 348, to show how the rootlets were attached to the floating stem; for which see also Lesquereux's descriptions and figures in Coal Flora of Pennsylvania, 1880, page 515, with varieties *S. undulata*, *reticulata stellata*, *sigillarioides*, *inæqualis*, *etc.* — White reports that *Stigmaria* crowd the Powelton *roof* shales of the *Fulton Cook coal bed* at the Ocean mine tunnel; and also are very abundant in the *parting shales*. (T3, 62, 319.)—*XIII.*

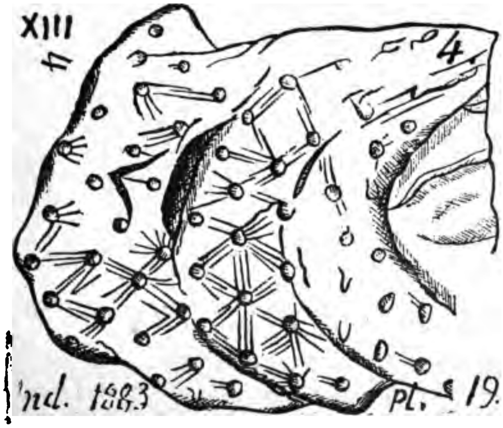


Stigmaria ficoides occurs also in Koch's collection of specimens from the *Tipton coal* beds, Blair Co, Pa. (Lacoe's MS. list, May 24, 1890, Specimen No. 810,) in *Pocono sandstone.* *X.*

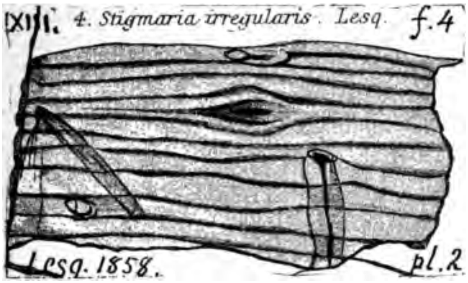
Stigmaria ficoides, var. *a*, *b*. *c*, *d*, *e*, *f*, *g*, *h*. *i*. *k*. *l*. Dawson, Q. J. G. Soc. Lond. 1865, Vol. 22, page 148, (S. A. M.) *XIII.*

Stigmaria ficoides, var. **reticulata,** Goeppert, Gatt. d, Foss. Pf. 1841. (S. A. M.) *XIII.*

Stigmaria ficoides, var. **stellata.** Goepp (Lesq. Coal Flora of Pa Report P. 1880, page 515, plate 74, fig. 4.) Collett's Indiana Report for 1883, page 96, plate 19, fig 4; the bark marked with short broad lines, diverging starlike from the scars. (Lesq.) *Coal measures.* *XIII.*

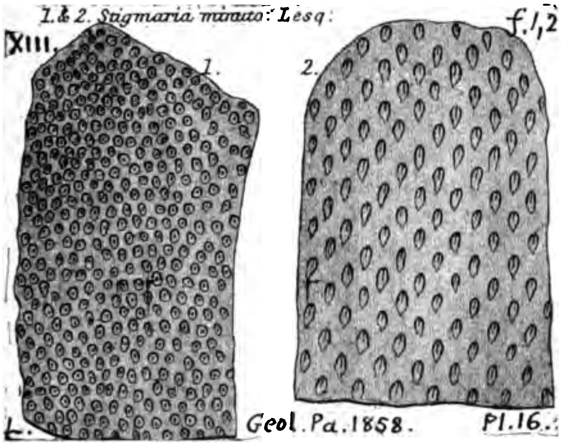


[**Stigmaria ficoides, var. undulata,** Goep. (Lesq.)



Stigmaria irregularis, Lesq. Geol. Pa. 1858, p. 870, pl. 2, fig. 4; deeply and narrowly ribbed; scars distinct and few; single specimens from Gate Vein, Pottsville; peculiar looking, but with rootlet marks and therefore a *Stigmaria*. *XIII.*

Stigmaria ? leioderma, Lesq. inedit. Specimen No. 1068, in Lacoe's cabinet at Pittston, Pa., from the *Kittanning coal* at Cannelton, Beaver Co. *XIII.*



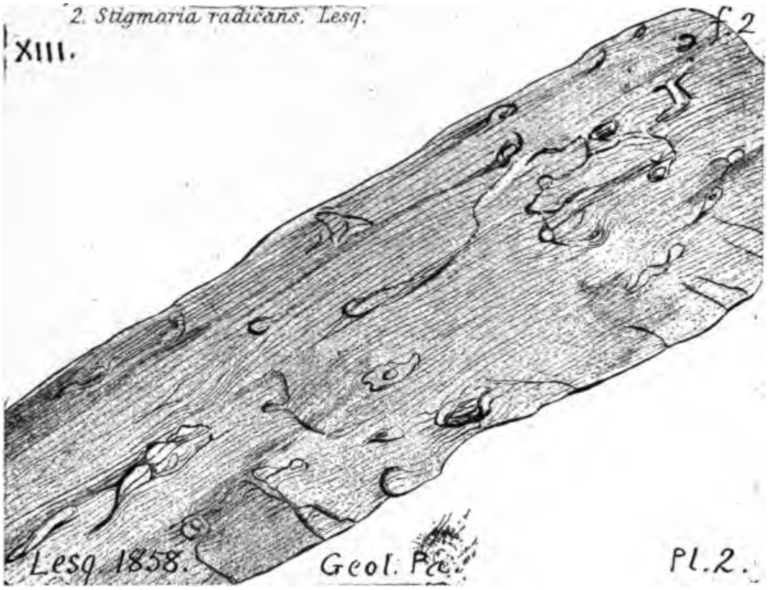
Stigmaria minuta. Lesquereux. Geol. Pa. p. 871, pl. 16, figs. 1, 2, both found in the *Pocono* (*Vespertine*) sandstone rocks below Pottsville, Pa. There are transition forms between the fig. 1, *Stigmaria* and fig. 2, *Sigillaria*, perhaps *Lepidodondron.*—In the Coal Flora, 1880, page 377, Lesquereux places it under Dawson's *L. corrugatum*, and with it Meek's *Lep. scobiniforme*, Akron, Ohio. — Lesquereux finds it among Ashburner's collections at the E. B. T. RR. tunnel through Sidling Hill, Huntingdon Co., Pa. (T3, 88), in *Pocono sandstone.* *X.*

Stigmaria minutissima, Dawson, Foss. Plants of Canada, 1871, page 23. (S. A. M.) *VIII–IX.*

Stigmaria perlata, Dawson, idem, *VIII–IX.*

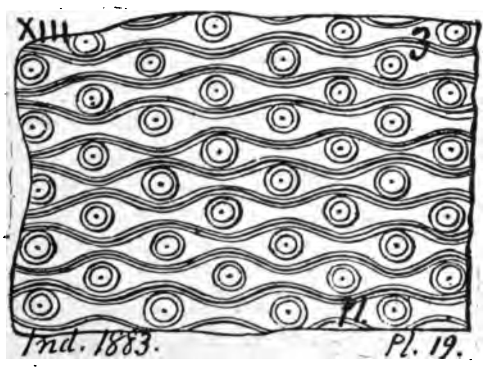
Stigmaria pusilla, Dawson, Q. J. G. S. Lond. Vol. 19, 1863, page 400. (S. A. M.) *VIII–IX.*

Stigmaria (*ficoides, var.*) **radicans.** Lesq., Geol. Pa., 1858, p. 870, pl. 2, fig. 2; with round rootlets; from *Salem* anthracite *vein* at Pottsville, Pa.; scarcely a true *Stigmaria*, but more like a root; placed by Lesq. in Coal Flora, under *Stigmaria ficoides*, var. *inœqualis*, p. 516. *XIII.*


2. Stigmaria radicans. Lesq.
XIII.
f. 2
Lesq. 1858.
Geol. Pa.
Pl. 2.

Stigmaria rugosa, Lesqx. inedit. Specimen No. 867 in Lacoe's cabinet at Pittston, Pa., from *Anthracite bed* at Rausch Gap, Pa. *XIII?*

Stigmaria undulata; Goep. (considered by Lesquereux as merely a variety of *Stigmaria ficoides;* Coal Flora of Pa. 1880, page, 515, plate 74, fig. 2, 3). Collet's Indiana Rt. 1883, p. 96, plate 19, fig. 3; the waves being produced by contraction, or pressure, and often seen on one side, and and not seen on the



other, of a slighty bent stem; as discussed and figured by Davidson in a plate in the Geological Magazine, London, July, 1888, No. 7.—*XIII. Coal Measures.*—NOTE. For the above reason this is not a *species;* and only serves to throw additional doubt on specific distinctions so abundantly published in memoirs and text books relating to ancient plants.

"**Stigmaria** with leaves, or roots, of *Sigillaria brardii*," Lesquereux's label on Spec. C 5–5, in White's coll. in Washington Co., Pa., from roof shales of *Washington limestone.* in the *Upper Barren Coal Measures*, *XVI.*

Stigmaria specimens in Mr. Carll's collections from the Venango Co. Conglomerate fire-clays are 2826, 2832, 2833, 2837; also 2838, 2839, 2841, 2842, 2854, 2855, all in whitish sandstone; 2859, in reddish sandstone; 2931, in yellowish brown sandstone. *XII.*

Stigmaria stems and rootlets fill the under-clay of Bissel's (*Freeport upper*) coal bed, Stewart township, Fayette Co. (K3, 196); and they occur in the *partings* of the same bed, at White Rock station, Connellsville township, Fayette Co. (K2, 192). This instance is a good example of the practical utility of noting this species of coal plants; for this Swank mine was popularly believed to be in the *Pittsburgh* (*Connellsville*) *coal bed*, which is 600′ higher in the series, and the great bed of the region. But, apart from structural evidence (dip, etc.), against such an opinion, it would have been sufficient to notice the fact that the *Pittsburgh coal partings* never show *Stigmaria;* that is, they are not true under-clay. Sir W. E. Logan was the first geologist to show (about 1833) that *Stigmaria* never occurs except in under-clay (K2, 192).

Stigmarioides evenii. (*Stigmaria evenii*, Lesquereux. Illinois Report Vol. 2, plate 39, f. 9.—Coal Flora of Pa., page 833, plate 75, fig. 1, doubtfully referred to *Stigmaria*, from Mazoon creek nodules). Collett's Indiana Rt. 1883, p. 96, plate 19,

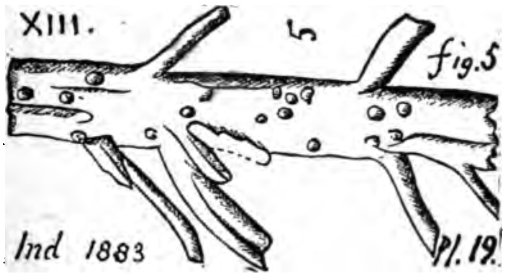
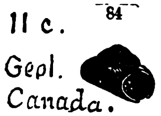


fig. 5. Organs representing *roots*, of soft cellular texture, are rarely preserved in coal shale; the few known have been found in iron balls at Mazon creek, Ill. (Collett). *XIII.*

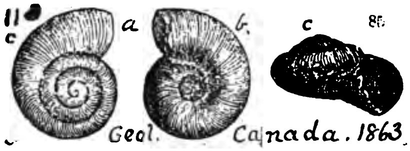
Stigmariopsis harveyi, Lesqx. inedit. Specimen No. 1120 in Lacoe's cabinet at Pittston, Pa., from the Washington Co., Ark. "*interconglomerate coal.*" *XII.* (?)

Stigmatocanna volkmanniana ? determined by Lesquereux from Ashburner's collections at the mouth of the E. B. T. RR. tunnel through Sidling Hill, Huntingdon Co., Pa. (T3, 88). *Pocono sandstone*, middle division, coal beds. *X.*

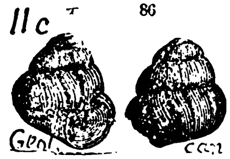
Straparollina (*Straparollus*) **asperostriatus,** Billings. Canad. Geol. and Nat. 1860. — Geol. Canada, 1863, p. 144, fig. 84. *Black river limestone. II c.*



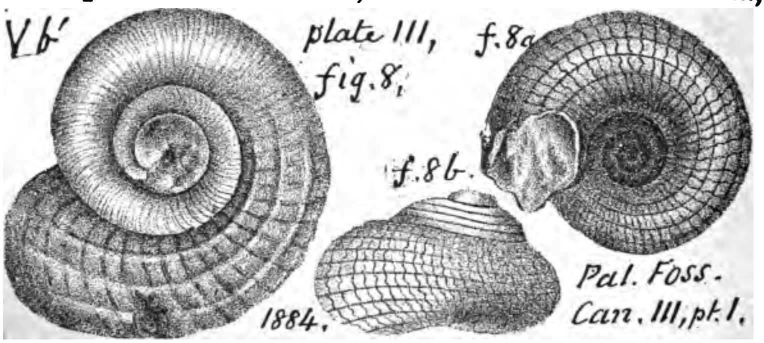
Straparollina (*Straparollus*) **circe,** Billings. Canada, Nat. and Geol. Vol. 5, 1860. Geol. Canada, 1863, page 144, fig. 85, *a*, *b*, *c*. *Black river limestone. II c.*



Straparollina (*Straparollus*) **eurydice,** Billings. Canad. Nat. and Geol. Vol. 5, 1860. — Geology of Canada, 1863, page 144, fig. 86, *a*, *b*. *Black-river limestone. II c.*

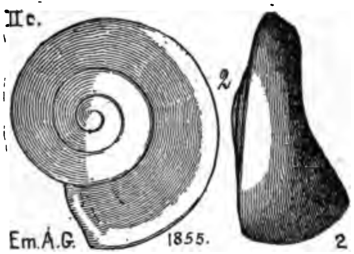


Straparollus crenulotus, Whiteaves. Pal. Foss. Canada,

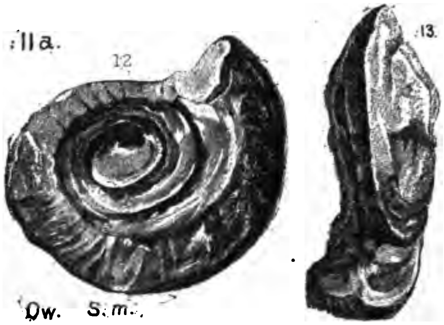


III, i, 1884, page 21, plate 3, fig. 8, large specimen from Durham, Can. W., seen from above; 8 *a*, side view of a smaller one; 8 *b*, its base; only these two specimens found. Not a *Straparollus* as defined by D'Orbigny, McCoy, DeKoninck and Stoliczka; but a *Straparollus* as defined by Nicholson, and by Hall. Probably generically allied closely to *Euomphalus funatus*, and *E. rugosus*, Sowerby, of the English *Wenlock limestone.* — *Guelph* (*upper Niagara*) *formation.* *V b'*.

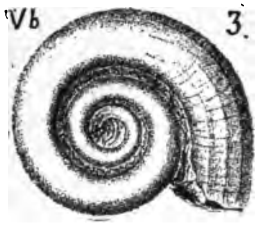
Straparollus labiatus. Emmons, American Geol. 87, Vol. 1, part 2, 1855, page 157, plate 2, fig. 2. Outer whorl rapidly widening below to a wide, angular mouth; surface smooth. *Birdseye limestone.* *II c.*



Straparollus (*Euomphalus*) **minnesotensis.** Owen, Geol. Wisc., Iowa and Minn. 1852, plate 2, figs. 12, 13, a cast found in the Lower Magnesian limestone of Traverse des Sioux, and St. Peters' river. *II a.*

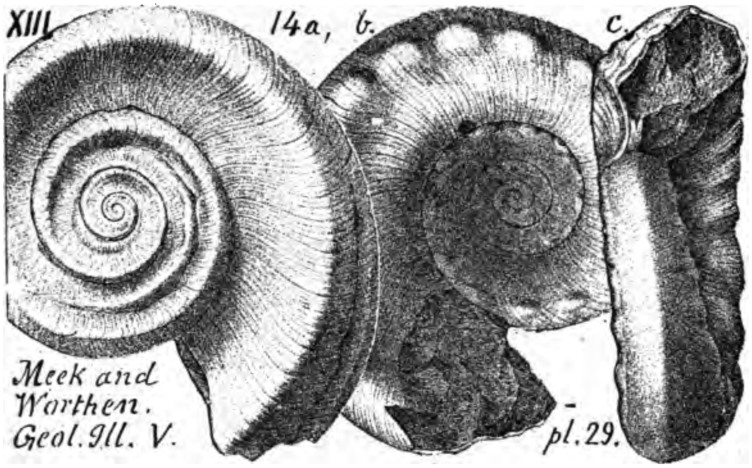


Straparollus niagarensis, Hall and Whitfield, Pal. Ohio Vol. 2, page 144, plate 8, fig. 3, top of an internal cast; and the species is only known from casts strikingly like *Euomphalus* (*Straparollus*) *laxus*, Hall, and *E.* (?) *noveboracensis*, Hall, which retain their shells; but if this species retained its shell it is easy to see that its whorls would be in contact, like *E. clymenioides*, Hall, from the *Schoharie* grit, N. Y. It



differs from *S. mopsus*, Hall, Wisconsin, *Niagara*, in fewer and more rapidly enlarging whorls, surface ridges, and depressed spire. Cedarville, O, *Niagara upper beds*. *V b*.

Straparollus (*Euomphalus*) **pernodosus**, Meek & Worthen, Proc. Acad. Nat. Sci. Phil. 1870, M. & W., Geo. Sur. Ill., Vol. 5, 1873, page 604, plate 29, figs. 14 *a*, *b*, *c*, *natural size*, upper and lower sides and profile. Found at Alton, Ill. *Lower coal measures*. *XIII*.


XIII
14a, b.
c.
Meek and Worthen. Geol. Ill. V.
pl. 29.

Straparollus planidorsatus (*Euomphalus planidorsatus*). Meek & Worthen, Proc. Acad. Nat. Sci. Philad. 1860. *Chester limestone.*—In S. W. Pennsylvania, among Stevenson's list of *Lower carboniferous fossils*. (K3, 311).

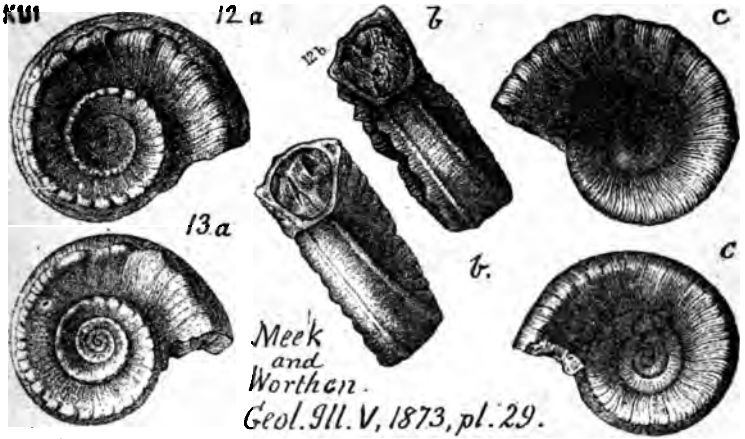
Straparollus planispira. See **Euomphalus planispira**. *XI*.

Straparollus rugosus. See **Euomphalus rugosus**. *XIII*.

Straparollus sordidus. See **Ophileta sordida**. *II a*.

Straparollus (*Euomphalus*) **subquadratus,** Meek & Worthen. Proc. Acad. Nat. Sci. Phil. 1870; M. & W., Geo. Sur. Ill., Vol. 5, 1873, page 605, plate 29, fig. 12 *a*, *b*, *c*, upper, profile, and under side of a specimen *natural size;* 13 *a*, a slightly varied form found with the other; *b*, *c*, profile, under side. The species is nearly allied to Hall's Iowa shell *Euomphalus rugosus* (not Sowerby's), which, however, is very much smaller. Both, with Conrad's *E. catilloides*, related to *E. quadratus*, Mc-

XVI

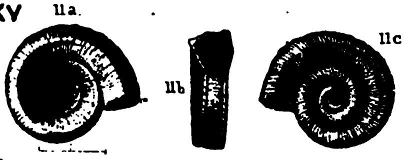


Meek and Worthen. Geol. Ill. V, 1873, pl. 29.

Coy, in the *Mountain limestone* of Great Britain.—Mont. Co., Ill. *Upper coal measures. XV?*

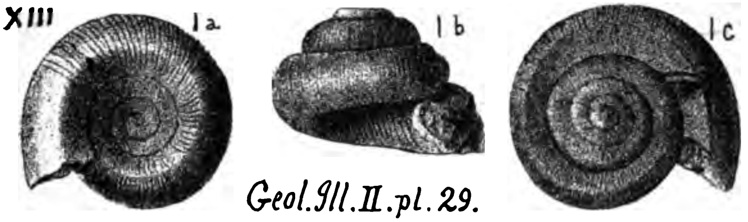
Straparollus (*Euomphalus*) *subrugosus*, Meek & Worthen, Proc. Acad. Nat. Sci. Phil. 1870.—M. & W.. Geo. Sur. Ill., Vol. 5, 1873, page 607, plate 29, figs. 11*a*, *magnified twice*, a rather small specimen, upper side; about the common size of an adult shell; *b*, *c*, profile and under side. (Identical with Hall's **Euomphalus rugosus**, on page 231, above.) Roof shale of coal 8, Ill., and more rarely in the *Lower coal measures. XIII, XV.*

XIII, XV
M. & Wor. Geo. Ill. V. 29.



Straparollus umbilicatus, (*Euomphalus umbilicatus*,

XIII

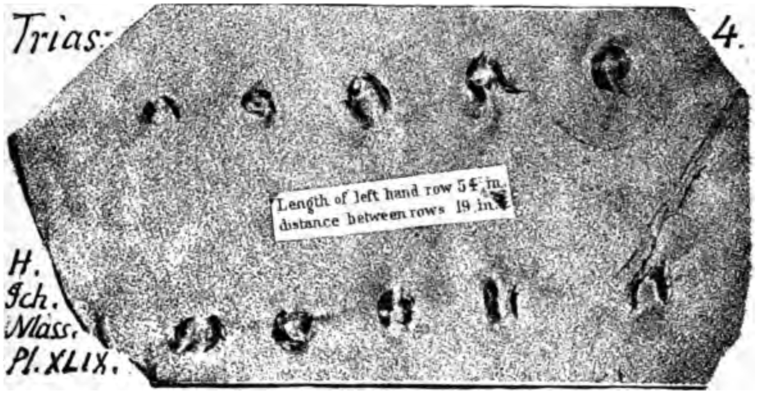


Geol. Ill. II. pl. 29.

Meek and Worthen, Proc. Acad. Nat. Sci. Phil., 1860, M & W; Geo. Sur. Ill., Vol. 2, 1866, page 362, plate 29, figs. 1*a*, *b*, *c*; evidently allied to the English *S.* (*Cirrus*) *acutus*, Sowerby. St Clair, Ill. *Lower coal measures. XIII.*

Straparollus, in fossiliferous bed 2¼ m. N. W. of Pleasantville, Venango Co., Pa. (I, 79).—Numerous in Randall's subdivisions F, G, H, at Warren (IIII, 305).—In Third mountain sand (IIII, 273).—Fine specimens from near base of large exposure of *Corry* (*Second mountain*) *sandstone*, in Warren Co., near Crawford Co. line (Q 4, 93).—In *Crawford shales;* also in *Subolean* (*Shenango*) *sandstone:* also rare and badly preserved in upper *Shenango shales*, Mercer Co. (Q3, 60, 61, 124; Q4, 78).—Noticeable in the red brecciated limestone 30′ above the top of the *Pocono*, at Baker's quarry, Trough Cr., Huntingdon Co., (T3, 76, 283). *X-XI.*

Stratipes latus, *tracks.* Hitchcock, Ich. Mass. 1858, page



149, plate 49, fig. 4, *reduced* ambrotype of a slab with two rows of a two toed (?) animal's footprints; length of each row more than six feet; width of trackway 27 in.; clean space between rows 20 inches, making the body of the animal perhaps 12 or 15 inches wide. Found on the upper side of one of the best slabs of tracks ever obtained; in Mr. Field's orchard, at Turner's falls, Mass. One slab with nearly a hundred very distinct tracks is in the Boston S. N. H. museum; its relief mold is at Amherst, and has the *S. latus* with almost no other tracks on its upper side, and probably the animal was wading or swimming; perhaps a huge marine tortoise, but that would show five toes; probably a gigantic Crustacean, with forked feet. Hitchcock notes that the seventy tracks on the underside of the slab are so sharply impressed that the mud must have been out of water. *Trias.*

Streblopteria ? tenuilineata. Meek and Worthen (*Pecten tenuilineatus*, Proc. Acad. Nat. Sci., Phila. 1860), M. & W. Geo. Sur. Ill., Vol. 2, 1866, page 334, plate 26, fig. 9*a*, right valve; *b* *enlargement* of the very fine (microscopic) concentric striæ, with the faintest trace of ray ribs, easily overlooked. Species near *Pecten pusillus*, Schlot. (See King's Permian Fossils of England, pl. XIII, figs. 1, 2, 3, 4). McCoy's description (Brit. Pal. Foss. p. 477) would make them identical; and perhaps also with *Pecten sericeus*, of Geinitz (Dyas, pl. xv, xix) also Permian (the same as *Avicula sericea*, De Verneuil.) Found in Clinton Co., Ill. (with *Monopteria*, *Gervillia*, and *Myalina*) near *Coal No. 11*, *XV? XVI?*

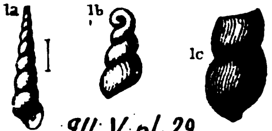
XVI U C M

Meek and W. Geol. Ill. II, pl. 26

Strephochetus ocellatus, Seely. Am. Jour. Sci. Vol. 3d, 1885, p. 357. A little sponge, sometimes figured as sections of the stem of *Phytopsis tubulosum*, Hall, and regarded as the characteristic mark of the *Birdseye formation* of New York, but really not a Birdseye fossil at all, but having its home (like *S. brainerdi*, Seely A. J. S. Vol. 32) among the characteristic forms of the middle division (B) of the *Chazy formation* in Vermont and Canada, with *Maclurea magna*, and a massive *Stromatocerium*. The lower division (A) is full of sponges, corals, orthids, gasteropods; the upper division (C) has many corals, *Solenopora*, *Orthoceras*, *Calymene*, *Illænus*, *Rhynchonella*. (Brainard & Seely, on the *Calciferous* formation in the Champlain Valley. Bull. Geol. Soc. Amer. Vol. 1, 1890, p. 502, 511.) — *S. aratus*, Seely, is a *Black River* species. — *S. richmondensis* (*Stromatocerium richmondensis*, S. A. Miller, Journal of the Cin. Soc. Nat. Hist. Vol. 5, p. 41) is a *Hudson river* species.—*II b.*

Streptacis whitfieldi, Meek, Proc. Acad. Nat. Sci. Phil., 1871; M. & W., Geo. Sur. Ill., Vol. 5, 1873, page 596, plate 29, fig. 1*a*, *magnified about 4 times;* *b*, *magnified* still more, showing the first whorl at the apex reversed or raised edge upward. Found in the roof of the *Danville coal*, Illinois. *XIII.*

XIII Meek and Wor. Geol. Ill. V, pl. 29.



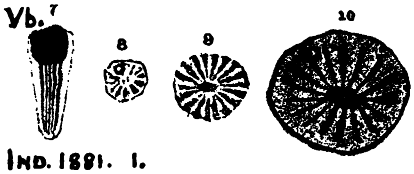
Streptelasma æquidistans, Hall, Foss. Corals, 1882; 35th Rt. Mus. p. 424. *Up. Held. VIII a.*

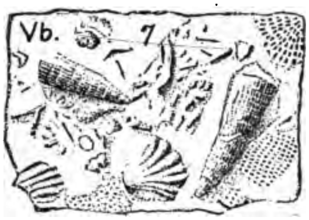
Streptelasma ampliatum, Hall. ditto, p. 423. *VIII a.*

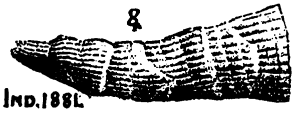
Streptelasma angulatum, Bill. (*Petræa angulata*) Pal. Foss. Vol. 1, 1862, p. 103, Hud. riv. *III b.*

Streptelasma apertum, ditto, p. 102. Black riv. *II c.*

Streptelasma borealis, Nich. (*Duncanella borealis*, Ann. Mag. N. H. [4] XIII, 1874; *S. minima*, Hall, 28th Rt. 1876; *S.* (*D.*) *borealis*, Nicholson, 28th Rt. N. Y. mus. edition, 1879.) Hall, in Collett's IndianaReport, 1881, page 226, plate 1, figs. 7 to 10, and plate 4, figs. 7, 8. Waldron, Indiana, N*iagara beds. V. b.*

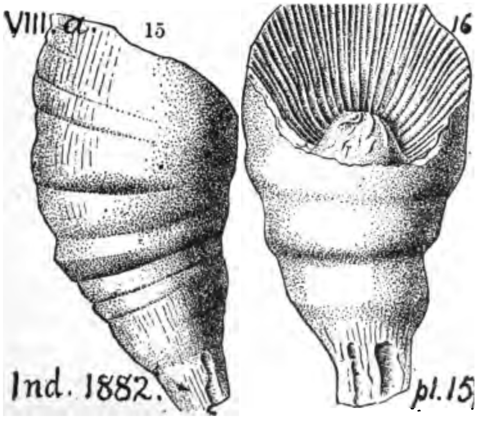






Streptelasma calyculus, Hall, 1852. *Niag. V b.*

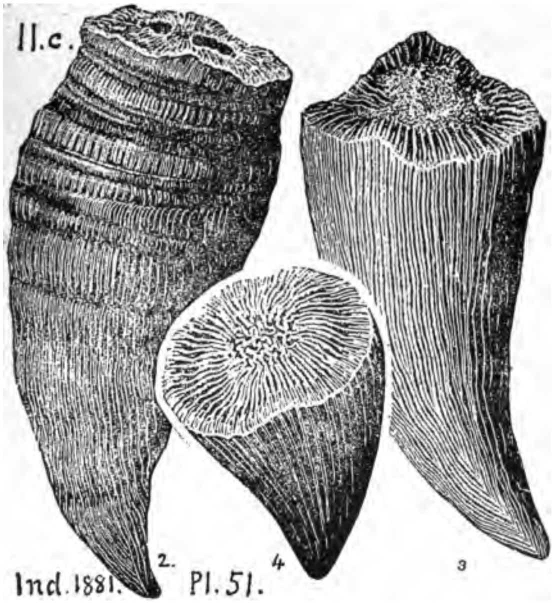
Streptelasma coarctatum. (Hall, 35th Annual Report of the N. York State Museum of Nat. Hist. 1882.) Collett's Indiana Report of 1882, page 275, plate 15, fig. 15, 16, side and back views, showing interior of cup (calyx) with its twisted plates (lamellæ).— *Corniferous* (*Upper Helderberg*) *limestone*, Louisville, Ky. *VIII a.*



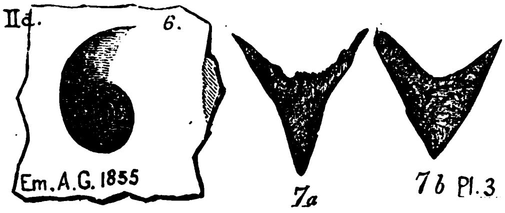
Streptelasma conspicuum, Hall, Foss. Corals, 1882; 15th Rt. p. 423. *U. H. VIII a.*

Streptelasma conulus, Rominger, Foss. Corals, 1876, p. 144. *Niagara. V b.*

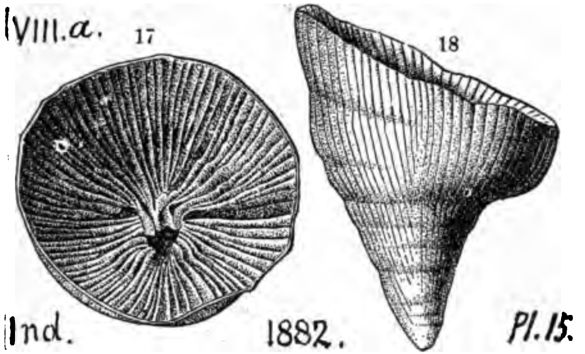
Streptelasma corniculum. Hall, (1847 Pal. N. Y. Vol. I, p. 69.) In Collett's Indiana Report of 1881, page 376, plate 51, fig. 2, the cups (calices) of the corallum broken away; fig. 3, shows another similarly broken; fig. 4, the lower portion of another, showing the partitions (septa.) — *Trenton limestone* in New York; abundant and much larger in the *Hudson river slate* in Ohio and Indiana. Not Munster's *Petræa.* — Another copy of Hall's figure in Zittel, vol. 1, page 217, f. 126, showing the middle line from which the curves diverge. — In Pennsylvania, Huntingdon Co., they crowd some of the *Trenton beds* (T3, 367). Also found in Centre Co. (T4, 424.) — *II c ; III b.*


II.c.
2.
4
3
Ind. 1881.
Pl. 51.

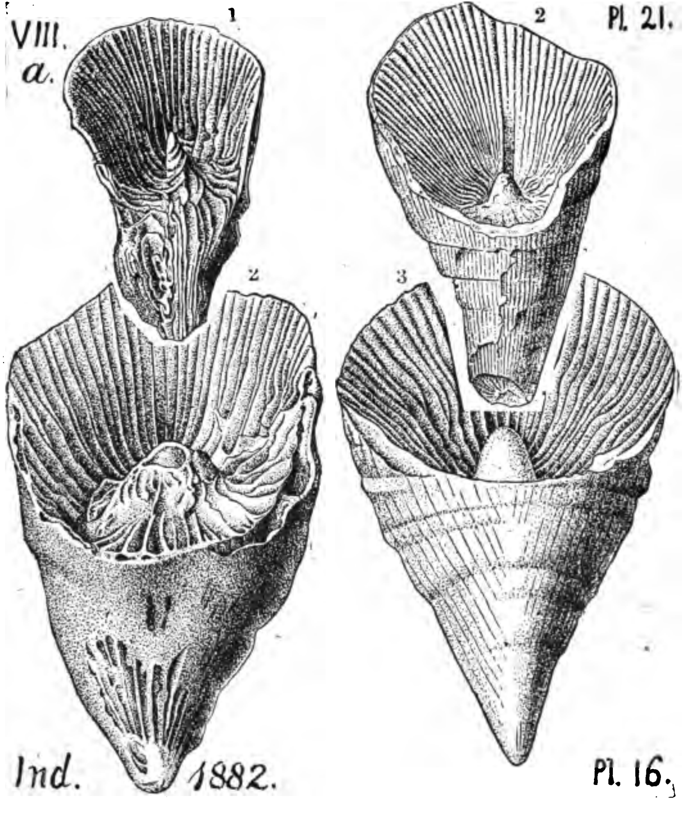
Streptelasma expansum. (Hall, Pal. N. Y. Vol. 1, 1847, *Chazy*). Emmons, Am. Geo. Vol. 1, ii, 228, plate 3, fig. 6, 7, *a*, *b ;* a small funnel-shaped coral, with a deep cup, and numerous partitions (septa); often so worn down as to make a forked appearance. *Chazy formation. II b.*



Streptelasma inflatum. (Hall, 35th An. Rt. N. Y. State Museum, 1882). Collett's Indiana Report of 1882, page 276, plate 15, fig. 17, calyx or cup of the coral; fig. 18, side view of an ordinary sized specimen; somewhat resembling *Zaphrentis corticata*, with coarser plates, differently arranged at center, etc. *Corniferous. VIII a.*

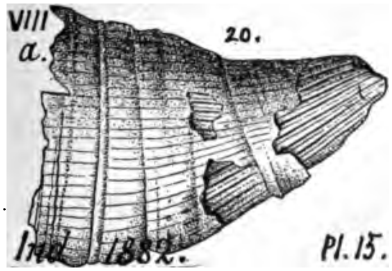


Streptelasma mammiferum. (Hall, 35th Annual Report



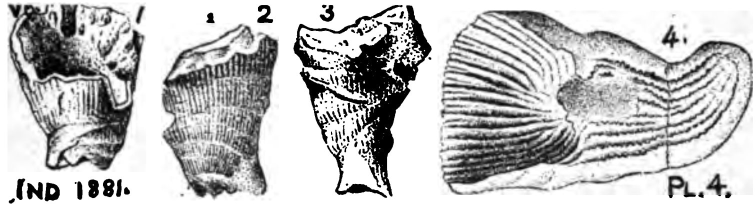
of the N. Y. State Museum of Natural History, 1882). Collett's Indiana Report of 1882, page 278, plate 16, fig. 2, worn specimen with broken plates (lamellæ); fig. 3, nearly entire specimen, showing central cone; plate 21, fig. 1, front of specimen with the wall removed, showing the plates, with twisted cone; fig. 2, front of another, with broken margin, showing cup and cone. Falls of the Ohio *Corniferous limestone. VIII a.*

Streptelasma papillatum. (Hall, 35th An. Rt. N. Y. State Mus. 1882). Collett's Indiana Rt. of 1882, page 276, plate 15, fig. 20, ordinary size of coral. Falls of the Ohio. *Corniferous limestone. VIII a.*


VIII a.
20.
Ind 1882.
Pl. 15.

Streptelasma poliferum. See **Lophophyllum proliferum.** See Spec. C. 1–3 (eight examples) from the limestone in the Westmoreland Co. *Pittsburg Barren measures. XIV.*

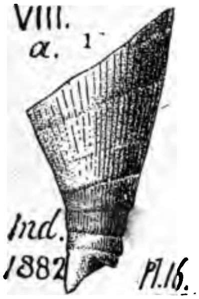
Streptelasma radicans, Hall, in Collett's Indiana Report 1881, page 226, plate 4, fig. 1–4.



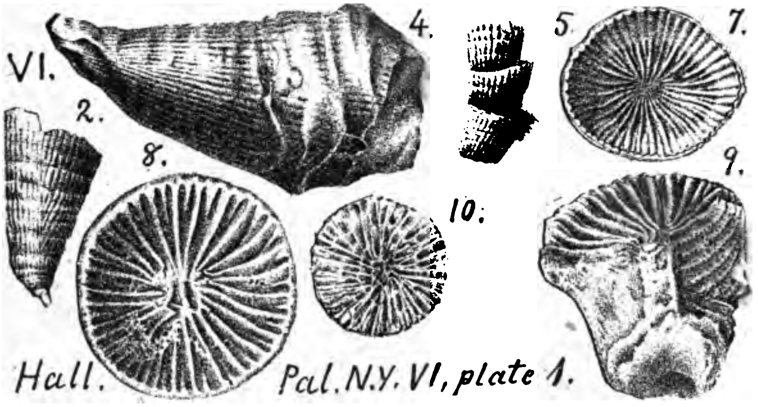
Streptelasma rectum. (*Strombodes rectus*). Hall, Geol. N. Y. 1843, page 209, fig. 87, 5. *Hamilton.* — In Pennsylvania, Perry Co. Comp's Mill, Spec. 11,637; Drumgold's tannery, 12,385 (two); Brickfield, 12.493. — Columbia Co., Bloomsburg, 12,161 (two), 12,185 (box full). — All from *Hamilton upper shales.* — See also, perhaps, Spec. 804–28, 804–90, from Marshall's Falls, Monroe Co.,

both certainly *Streptelasma* (J. Hall), but of uncertain species, from *Hamilton beds. VIII c.*

Streptelasma simplex. (Hall, 35th Annual Report of New York State Museum of Natural History, August, 1882). Collett's Indiana Geological Report of 1882, page 277, plate 16, fig. 1, side view of an individual coral of ordinary dimensions. Falls of the Ohio. *Corniferous limestone. VIII a.*



Streptelasma strictum, Hall, Pal. N. Y. Vol. VI, 1887, page 1, plate 1, fig. 2, side view of specimen rather under usual size, showing rapid increase of lamellæ by interstitial additions along a single line upon one side of a continuous ray; 4, unusually large, increase of number of rays on one side at first and then on the other; 5, increase by successive budding; rare in some and common in other localities in New York; 7, well preserved calyx; 8, *enlarged* view of another; 9, ventral vertical section showing columella; 10, cross section below base of cup. *Lower Helderberg formation.* — On the Delaware river, at Port Jarvis, found by Dr. Barrett in White's *Stormville limestone* (G6, p. 134). — Perhaps in the richly fossilferous limestone at Mann's quarry, Monroe township, Bedford Co., Pa. (T2, p. 187). *VI.*



Streptelasma ungula, Hall. Illust. Devon. Fossils. 1876. *Hamilton*. See Specs. 11,674 (five) from Barnett's Mills, Perry Co., Pa. *Hamilton upper shales. VIII c.*

Streptorhynchus alternatum (*Orthisina alternata*), Hall, 13th Rt., 1860. *VIII c.*

S. americanum (*Hemipronites americanus*), Whitfield, Wiscon. Rt. Vol. 4, 1878. *III b.*

S. antiquatum (*Orthis antiquata*, Sowerby, 1839), found in Anticosti. *VI?*

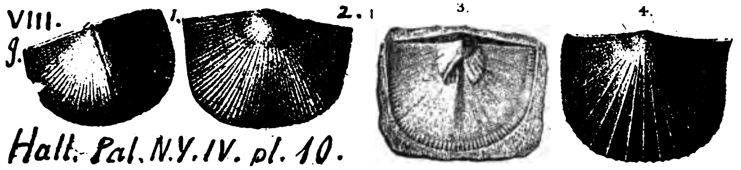
S. arctostriatum (*Strophomena arctostriata*), Hall, 1843. *VIII g.* (On account of this change, Hall's **S. arctostriatum**, 13th Rt. N. Y. Mus. 1860, p. 80, becomes a syn. of **Orthisina arctostriata**. S. A. M. 1889, p. 378). *VIII c.*

S. arctirostratum, a variety of **S. Chemungense**. *VIII g.*

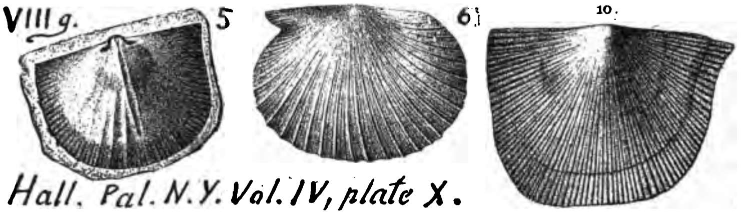
S. biloba, Hall, 1883. *Carboniferous. XIII?*

S. cardinale, Whitfield. Wisc. IV, 1880. *III b.*

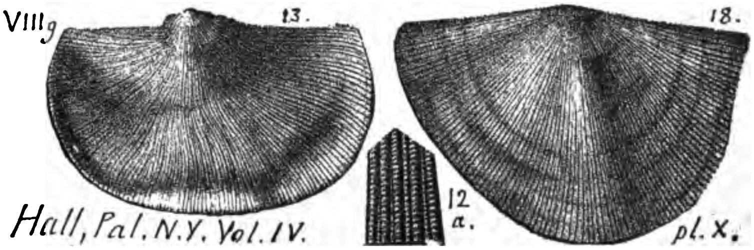
Streptorhynchus chemungense (*Strophonena chemun-*



Hall. Pal. N.Y. IV. pl. 10.



Hall. Pal. N.Y. Vol. IV, plate X.



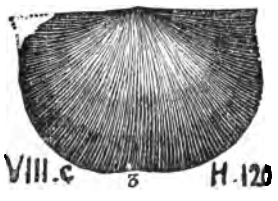
Hall, Pal. N.Y. Vol. IV. pl. X.

gensis, Conrad, Jour. Acad. N.S. Phila. 1843). Hall, Pal. N. Y. Vol. IV, 1867, page 67, plate 10, fig. 1, a dorsal valve, symmetrical, a little more convex than the common *pandora* variety of the *Cornif. lime.* (*VIII a*); striæ bifercate, finer ones interposed; fig. 2, ventral, nearly flat; fig. 3, its cast; fig. 4, dorsal, regularly convex, striæ sharp and bundled; fig. 5, its cast; fig. 6 (the original of *Strophomena pectinacea*), accidentally distorted; fig. 10, striæ characteristic of *S. pandora;* fig. 12 *a*, striæ *enlarged*, belonging to figs. 11 to 17; fig. 13, unsymmetrical; 18, ventral with deep coarse striæ. — In Bedford Co., Pa., a variety of it prevails throughout the *Hamilton formation* (T3, 83); also in Columbia Co. at Vanderslice's quarry, 100′ beneath top of *Hamilton* (G7, 229). — In Montour Co. it occurs in the *Stony Brook beds* (G7, 72, 308). — In Bedford Co. 1000′ beneath the *Chemung lower conglomerate*, bed 18 Saxton section on Yellow creek (T2, 80, 228); also in this conglomerate itself (T2, 117, 122, 133, 216); also above the *Chemung upper conglomerate* (T2, 78). — In Pike Co. it is the most common of the few forms seen in the *Chemung rocks* (G6, 105). — In Fayette Co. it is in the Devonian strata in the gaps (K3, 311). — In McKean Co., Wilcox hill, Spec. 3282 — In Erie Co. it abounds at the Lebœuff quarries, in the *Panama conglomerate* or *Third Oil Sand;* and multitudes lie in the Doolittle quarry (Q4, 110, 249, 272); also scattered through *Venango lower shales* under *Second Oil Sand* (Q4, 104); also, at Sagertown, in *First Oil Sand.* (Q4, 198). *VIII c, g, VIII–IX. IX?*

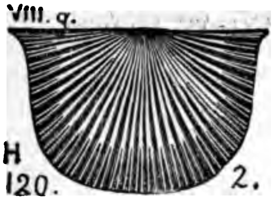
Specimens in the cabinet, OO, p. 236, from Sherwood's collections in various places in Tioga Co., Pa, 852–3 (striæ differing from the usual form), 852–6 (poor cast); –854–14 (broken); –855–1 (good dorsal valve), –2 (ditto), –5 (see Hall's fig. 8, plate 10, Pal. N. Y. Vol. 4), –9 (narrow, regularly rounded), –12 (broad, slightly convex form with slight sinus), –13 (see Hall's fig. 18), –15 (one spec. flat, another convex, with sinus along middle), –16 (rounded at ends, sinus), –17 (J. H.), –34 (small, flat), –35 (J. Hall, one flat; one impression of dorsal valve), –36 (dorsal valve and cast showing scar), –41, –45 (very small), –47 b (small); –51, –57 (imp. of fragment); 856–15 (alternating striæ; with bits of lammellibranch shells), –49 (alter. striæ; –54 (J.H.) –858–12, –860–1 *b* (Jas. Hall), –5 (ventral valve), –11, –12 (flat valve), –16 (flat valve), –31, –38 (J. Hall), –40 (flat valve),

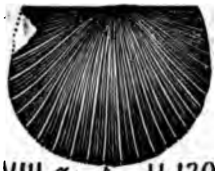
–50 (flat valve), –54 (good dorsal valve), –55 (J. Hall, flat valve), –60 *b* (Jas. Hall, and casts of large specimens), –61 *b* (impress of flat valves), –62 (two shells and two casts of interior of dorsal valve), –67 (J. H. flat valve), –77 (impress), –84, –85 *b* (cast of inside of ventral valve, showing crenulations of hinge line and muscular scars) ; 861 –18, –19, –21 (several flat valves), 861–18, –19, –21 (several flat valves), 861–33(?), –39. — OO, p. 237, 870 –7, –10, in collections of Howell, at Nichols, Tioga Co., N. Y. –872 –2*a* (like *S. chem.*), –20 (flat valves), –32, –38*a* (impressions), –47 (several), — 48 (probably), 882 –51 = Randall's 9468. — OO, p. 237, in Hicks' collections, McKean Co. 878 –2. — OO p. 238, 879 –3 in Sherwood's collections at Roulette, Potter Co. Pa. 883 –14 (sp. ?), –15, –25 (variety,) – 26, – 27 (variety ?), – 49 (variety ?), – 50 (variety ?), –51, –59 (slab composed of a mass of these shells, few of them perfect,) 883 –60 (several,) –61, –62 (several), –65 (variety), –67 (several in a slab,) –71 (variety), –72, –74 (five specimens), –78, –79, –80 *a*, –81, –82, –83 (flat valve), –84 (flat valve broken), –87, –88 (forty-one specimens, mostly small fragments and bits of impressions), –94 (two large slabs with numerous individuals representing different phases of this species), –683 –13 (fine show of muscular impressions). — All the foregoing were got in *Chemung* and *Upper Chemung strata VIII g.* — 891 –1, –3, –5, in Sherwood's collections near Linden, Lycoming Co., Pa., iron ore bed near top of *Chemung*, *VIII–IX ?*—9467, 9468, 9470, 9474 (a young individual) in Randall's collections at Warren, Pa. (wrongly labelled *Leptæna*) from *Chemung-Catskill ? beds VIII –IX.*

Streptorhynchus chemungense, var. **arctostriatum.** (*Strophomena arctostriata*, Hall. Geol. Fourth Dist. N. Y., 1843, page 266, fig. 120, 3. *Chemung.*—Pander's genus *Hemipronites*) — In McKean Co., Pa., Larabee Junction, Spec. 879–3 (OOO, 237), *Upper Chemung.*— In Perry Co., Barnett's mill, Spec. 11,708, 11,713 (six); Brickfield, Spec. 12,507; all from *Hamilton upper shale.*— *VIII c, g.*



Streptorhynchus chemungense, var. pectinaceum.

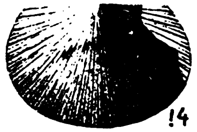


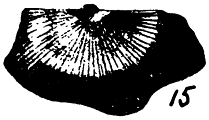

VIII. g.
4
H.120.

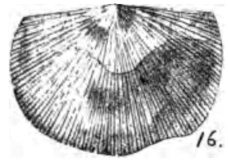
(*Strophomena bifurcata*, Hall Geol. 4th. Dist. N. Y., 1843, page 266, figs. 120, 2, 4. *Chemung.* — Found by J. Hall, with *Spirifera disjuncta*, *S. alta*, etc., in a fine-grained ferruginous sandstone, at Meadville, Crawford Co., Pa., in *Pocono* (*Waverly*) *strata.* (See Pal. N. Y. Vol. IV, page 249.) — *VIII g*, *X*.

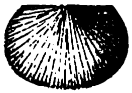
Streptorhynchus chemungense, var. perversum, Hall,

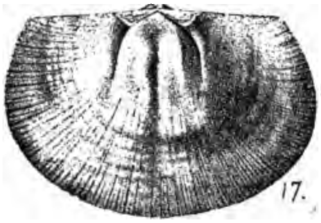
VIIIa
VIII c.
Hall.

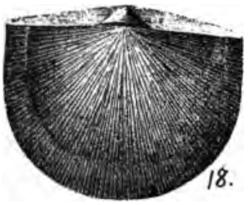












Pal. N. Y.
Vol. IV.
Plate IX.

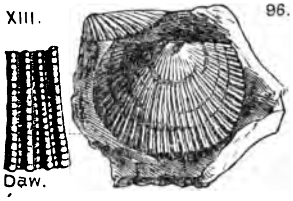
10th Rt., 1857. (*Orthisina alternata*, Hall, 13th, 1860.) Hall, Pal. N. Y. Vol. IV, 1867, page 72, plate 9, figs. 13, 14, dorsal valves, with alternate striæ; 15, imperfect ventral; 16, ventral, shell partly preserved; 17, large dorsal cast, impressions of alternate striæ; (18, added to compare a very symmetrical dorsal *S. pandora.*) On Seneca and Cayuga lakes in *Hamilton shale;* and a doubtful specimen in *Corniferous limestone*, at Williamsville, Erie Co., N. Y. — In Pennsylvania Claypole's Spec. 11,643, from Comp's mill, Perry Co., Pa., *Hamilton upper slate.* — *VIII a, c.*

Streptorhynchus chemungense, Spec. 891 -1*d*; 891 -5*b*; 891 -5, among Sherwood's collections at Linden, Lycoming Co., from *Mansfield iron ore bed*, top of *Chemung.* *VIII -IX.*

Streptorhynchus chemungense. Possibly a *new species;* peculiarly marked; Specs. 870-7 (two,) -10 in Ashburner's collections from strata *over Salamanca conglomerate*, *VIII g.*

Streptorhynchus crassum. *See* **Hemiponites crassus,** *page 282 above.* Specimens collected by C. E. Hall, in Congruity, Westmoreland Co. (OOO, p. 253). Spec. C1, -2*b*, -7, -9 (two); C2, -2 *b* (five), -6, -7 (fragment), -9 *a*, -13 (two); from *Barren measure limestone and shale. XIV.*

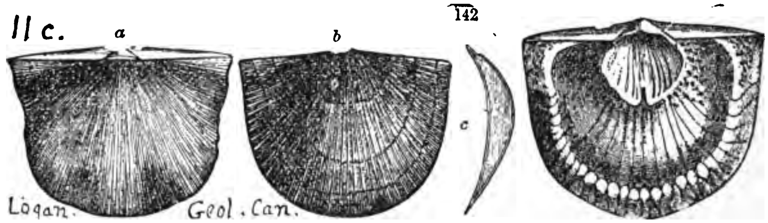
Streptorhynchus crenistrium (crenistria), Phillips. Geology of Yorkshire, Vol. 2, 1835. Dawson's Acadian Geology, 1868, page 296, fig. 96, with its sculpture *magnified;* several crushed valves found by Davidson on a piece of Picton *coal measure shale*, with smaller raised ray-ribs between larger ones, all closely insected by fine concentric lines. *XIII.* — Newberry's Pal. Ohio, Vol. 2, 1875, page 279, plate 10, figs. 5 a, b, c, d.

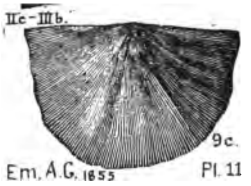


S. deflectum (*Strophomena deflecta*), Conrad, 1843. *II c.*

S. elongatum (var. of *S. subtentum*), James. Cin. Q. J. S. Vol. 1, 1874. *III b.*

Streptorhynchus filitextum. (*Strophemena filitexta.* Hall, Pal. N. Y. Vol. 1, 1847, *Trenton* and *Hud. riv.*) Emmons, Am. Geol. I, ii, 1855, 198, plate 11, fig. 9 *c*. Hind valve with strong muscular impressions; saucer formed area formed of a distinct layer of shelly matter coarsely folded; the whole shell pricked through (punctate). — Logan's Geol. Can. 1863, p. 154, fig. 142 *a*, *b*, ventral and dorsal valves; *c*, section of slightly convex specimen; *d*, interior of dorsal valve. *Trenton.* — Newberry's Pal. Ohio, Vol. 1, 1873, p. 83, pl. 6, f. 5 *a* to *c*. *II c*, *III b*.





S. flabellum, Whitfield, Desc. New Sp. Ohio, 1882, *VIII a.*

S. hallanum, S. A. Miller, Cin. Q. J. S. 1874, *III b.*

S. hemiaster. See **S. subplanum.**

Streptorhynchus hipparionyx. See **Orthis hipparionyx.** Stevenson reports it, under this name, as abundant, but not well preserved, south side of Bedford Springs; and at Hyndman, 104′ to 168′ below top of *Oriskany.* (T2, 86, 104, 148.) *VII.*

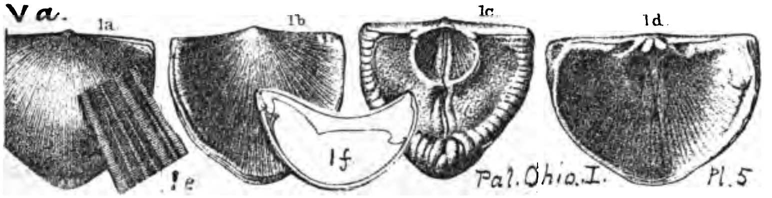
S. hydraulicum, Whitfield. D. N. S. Foss. Ohio, 1882. *VI.*

S. inflatum, White & W. Proc. B. S. N. H. 1862. *XI.*

S. lens, White, P. B. S. N. H. 1862. *VIII g.*

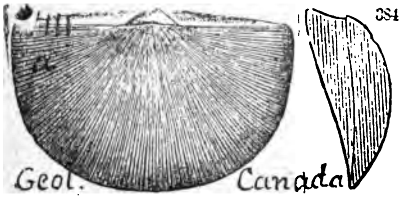
S. minor, Walcott, Mon. U. S. G. S. Vol. 8, 1885. *II c.*

Streptorhynchus (*Strophomena*) **nutans.** (*Hemipronites nutans*, James), Pal. Ohio, Vol. 1, page 77, plate 6, fig. 1 *a*, dorsal; *b*, ventral; *c*, interior of ventral valve, showing cavity for muscular attachment, hinge teeth area, pseudo-deitidium, and thickened, wrinkled and geniculated zone around the front and side margins; *d*, interior of dorsal valve; *e*, *magnified* surface markings; *f*, section of two valves united. Differs enough from *S. deltoidea* and *S. camerata*, Con., externally and internally, especially by its prominent subangular, nearly triangular shape. Butler, Warren and Clinton Cos., Ohio. *III b.*



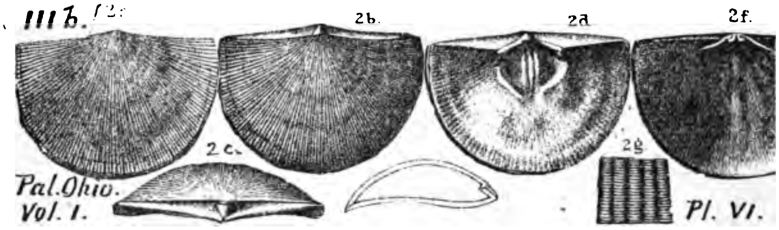
S. occidentale, Newb. See **Meekella striatocostata.**

Streptorhynchus pandora, Billings, Canadian Journal, 1860. Geology of Canada, 1863, page 369, fig. 384 *a*, dorsal valve; *b*, long section of it. *Corniferous limestone formation. VIII a.*

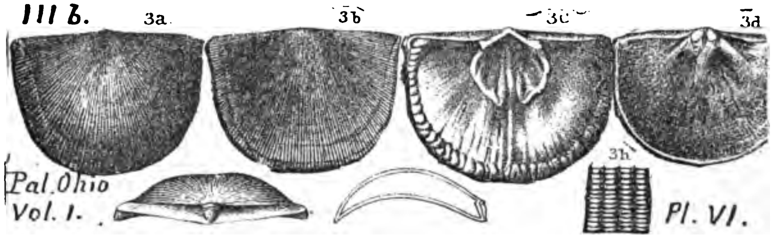


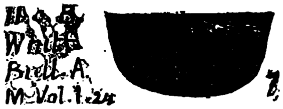
S. perversum (*Orthis perversa*, and *Orthisina alternata*), Hall, 1857, 1860. *VIII a, c.*

Streptorhynchus (*Leptæna*, *Strophomena*,) **planoconvexum,** Hall, Pal. N. Y. Vol. 1, 1847, *Hud. river.*—Pal. Ohio, Vol. 1. 1873, page 82, plate 6, fig. 2 *a*, ventral; *b*, dorsal; *c*, hind view, with area, pseudo-deltidium, and minute hole through the beak; *d*, interior of ventral valve; *c*, section; *f*, interior of dorsal valve, showing the very small bipartite hinge processes, oblique socket ridges, and obscure radiating ridges, with no definite muscular scars in the bottom of the shell; *g*, *magnified* surface markings. Cincinnati, 300′ above river. *Hudson river beds. III b.*



Streptorhynchus planumbonum, Hall. (Perhaps *Strophomena rugosa*, Blainville, 1825.—*Leptæna planumbona*, Hall, Pal. N. Y. I, 1847. — *Strophomena planumbona*, Hall, 12th Rt. 1859; Geol. Wisc. 1862.) — Meek in Pal. Ohio, Vol. I, 1873, page 79, plate 6, fig. 3*a*, ventral; *b*, dorsal; *c*, interior of ventral, cavity, hinge, thick wrinkled border; *d*, interior of dorsal, bifid hinge process, scars etc., *e*, section; *f*, hind view of united valves, area, pseudo-deltidium, etc.; *f*, *magnified* surface striæ. Clinton & Preble Cos. O. Richmond, Ind. Maysville, Ky., *Hudson river uppermost beds. III b.*

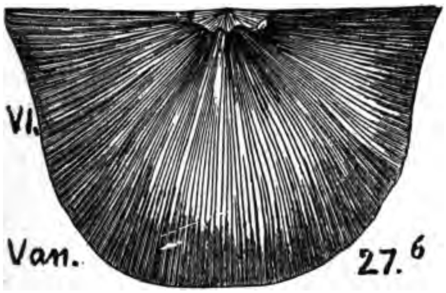




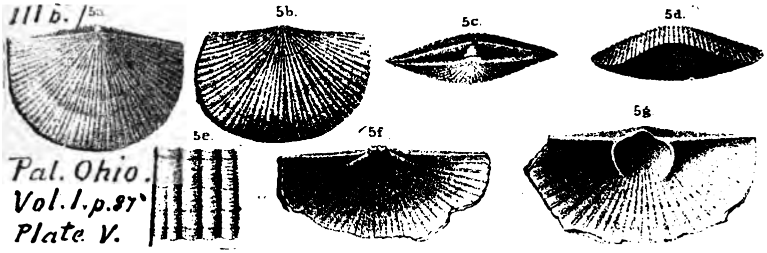
Streptorhynchus ? primordiale, Whitfield. Bull. Amer. Mus. Nat. Hist. N. Y., Vol. 1, No. 8, 1886, Art. 17, page 301, plate 24, fig. 7. *enlarged twice*, dorsal valve. The only shell thus striated found in the Lower Silurian formations; very different in this striation from *Strophomena* (*Leptœna*) *plicifera*, Hall, and *Leptœna incrassata*, Hall, from the *Chazy;* resembling more in general features the *Streptorhyncoids* (its descendants ?) of higher formations. Fort Cassin, Vt. "*Birdseye limestone*" beds, now recognized as *upper beds* of *Division D* of *Calciferous formation* (Brainard & Seely. Bull. Geol. Soc. Amer. Vol. 1, 1890, p. 506.) —*IIa.*

S. pyramidale, Newb. See **Meekella striatocostata.**

Streptorhynchus radiatum. (*Strophomena radiata.*) Vanuxem, Geology of the Third District of New York, 1842, page 122, fig. 27,2. *Lower Helderberg*, *VI.*



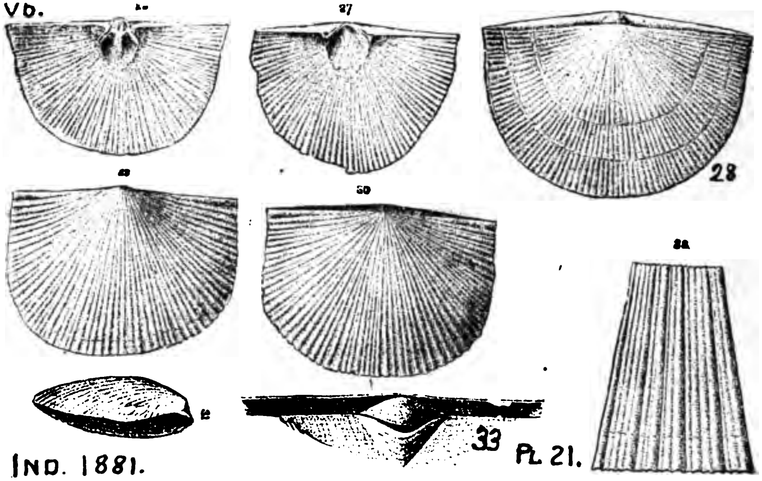
S. rectum (*Strophomena recta*) Conrad, 843. *II c.*

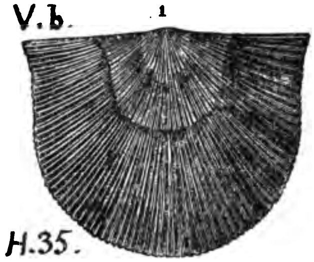


Streptorhynchus sinuatum (*Strophomena sinuata*, Emmons, Am. Geol. 1855.) James, — Pal. Ohio, page 87, plate 5, fig. 5*a*, dorsal; *b*, ventral; *c*, hinge view, showing minute hole through beak; *d*, front view showing much fainter sinus and fold than in 4*d;* *e*, *magnified* surface striæ; *f*, imperfect speci-

men, showing hinge process and socket ridges of inside dorsal valve; *g*, another, hinge teeth, muscular cavity, dental ridges etc. of ventral valve. [Meek remarks that it is so nearly like *S. sulcatus* that he should consider them identical but for the Cincinnati geologists collecting them separately from two horizons, 300 feet apart, and not finding either of them in the interval.] Cincinnati, 350′ above water. *Hudson river. III b.*

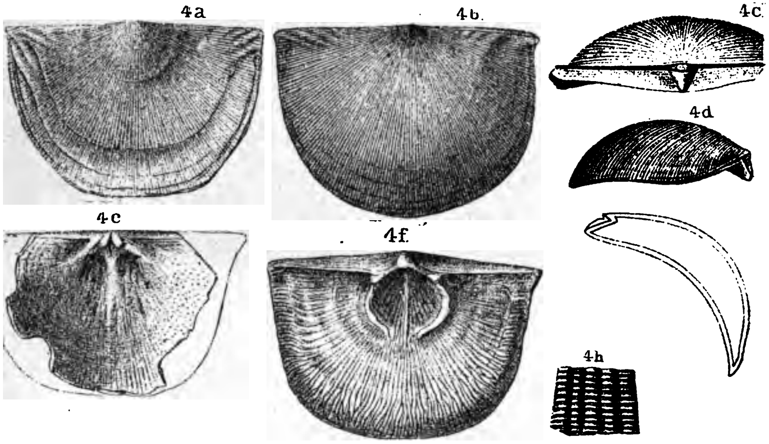
Streptorhynchus subplanum. (*Strophomena subplana* Conrad. Jour. Ac. Nat. Sci. Phil. Vol. 8, 1842, p. 258.) — Hall's Geol. N. Y. 1843, p. 104, fig. 35, 1. — Collett's Indiana Rt. of 1881, page 288, plate 21, figs. 26 to 33.—In Mifflin Co. Pa. McKeesville, Hall's Specs. 502-36, 505-30, in shales over *Clinton fossil ore bed;* also in Blair Co., Bell's Mills, in *Clinton lime shales.* — In Bedford Co., same horizon, at county farm; at Wolfsburg; at Old Weaver tunnel; at Jac. Walter's mine (well preserved); and on Yellow creek (T2, 140, 144, 150, 153, 198).— *V a.*



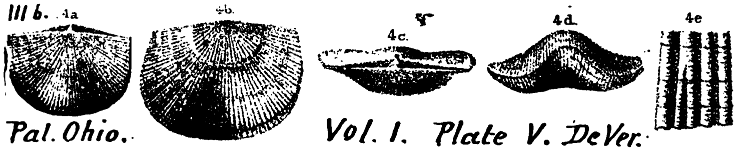


Streptorhynchus subtentum. (*Strophomena plicata,* Conrad), Pal. N. Y., Vol. 1, 1847. *Trenton and Hud. Riv.* —

Pal. Ohio, Vol. 1, 1873, page 81, plate 6, figs. 4*a*, *b*, *c*, *d*, ventral, dorsal, hinge and side views; 4*e*, inside of dorsal valve, with its short forked hinge-process, sockets, oblique socket-ridges, and obscure marks, (the outside shows the *characteristic oblique wrinkles;*) 4*f*, inside of ventral valve, hinge teeth, muscular cavity, hinge area, pseudo-deltidium; 1*g*, section of complete shell; *h*, *magnified* surface markings. (See Meek's notes.) Abundant and beautifully preserved at Richmond, Ind., and elsewhere in Ind. and Ohio. *Hudson river formation.* — *IIc*, *III b.*



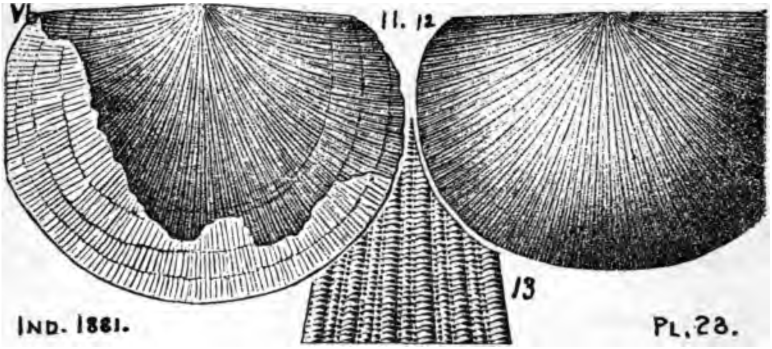
Streptorhynchus sulcatum (*Leptæna sulcata*, De Verneuil, Bull. Geol. Soc. France, Vol. 5, 1848, *Cincin. group.*) Pal. Ohio, Vol. 1, 1875, page 85, plate 5, fig. 4 *a*, dorsal valve of smaller specimen; *b*, ventral of larger one; *c*, hinge view; *d*, front view; *e*, *magnified* surface. [See note under *S. sinuatum.*] *III b.*



Pal. Ohio. Vol. I. Plate V. DeVer.

Streptorhynchus tenue, Hall. Trans. Alb. Inst. Vol. 4, 1858, *Niagara.* Hall, in Collett's Indiana Report of 1881, page 287, plate 23, figs. 11 to 13. — In Pennsylvania, Mifflin Co., McKeysville, in the shales over the *Clinton fossil ore bed.*

Spec. 501–2, –3, –4 (casts of ventral valve), –6, –26 *a*, –27, –29, –44; 502–2 (cast of ventral valve), 6 (impressions of both valves), –7 (casts), –20 (good ventral), –23 *b* (casts of ventral), –25 (some casts), –29, –39 (casts); 505–10, –13, –44, –45. *V a.*

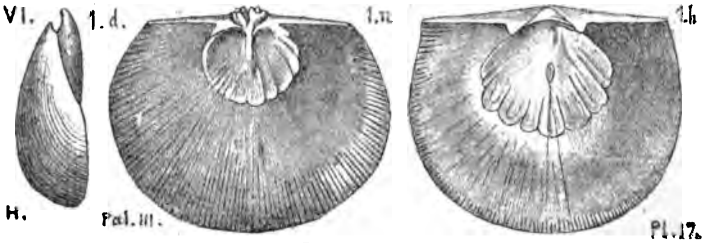


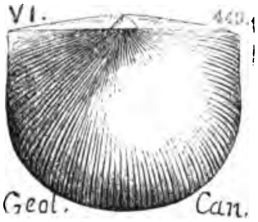
S. thalia (*Strophomena thalia*), Bill. *II c.*

S. umbraculum (*Terebratulites umbraculum*, Schlotheim, 1820. *Devonian* to *Permian* (S. A. M.)

S. umbraculum (var. of *S. subtentum*) James, Cin. Q. J. S. Vol. 1, 1874. *III b.* (S. A. M.)

Streptorhynchus woolworthanum (*Strophomena woolworthana.* Hall, 1859, Pal. N. Y. Vol. 3. *Low. Held.*) Logan's Geology of Canada, 1863, page 960, fig. 449. *VI.*





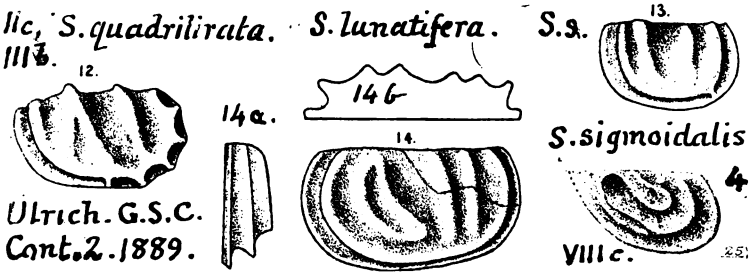
Streptorhynchus ——? Bedford Co., Monroe township, Mann's quarries, in richly fossiliferous layer of *Lower Helderberg limestone* (T2, 187). *VI.*

Streptorhynchus —— ? Bedford Co., Saxton section, bed No. 30, 100′ beneath the *Allegrippus* (*Chemung lower*) conglomerate, 1550′ beneath base of *Catskill* (T2, 79, 230). *VIII g.*

Streptorhynchus ——? Venango Co. Specimens 2909, 2915, 2916, 2946; also Warren Co., 3366; all of uncertain horizon Also 3319, from *Bedford shale. IX ?*

Streptorhynchus —— ? Crawford Co., abound in many places, of *Kinderhook facies*, in *Meadville upper limestone. X.*

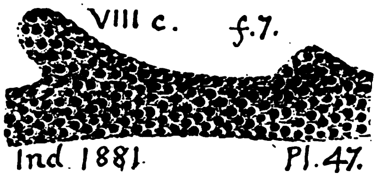
Strepula lunatifera, Ulrich, Geol. Sur. Canada, Cont. Micro. Camb. Sil. rocks, part 2, Montreal, 1889, page 56, plate 9, fig. 14, large right valve, *magnified 18 times*, having the crescent separated from the marginal ridge; 14 *a*, back end view, 14 b, section lengthwise. This fine species of *Lower Silurian* water flea is represented by a single valve on a small slab in Ells' coll. at Stony Mt., Manitoba, and by other specimens found in washings from *upper Hudson river beds* at Oxford, Ohio. Different from but related to *Strepula* (*Beyrichia*) *quadrilirata*, Hall & Whitfield. *III b.*



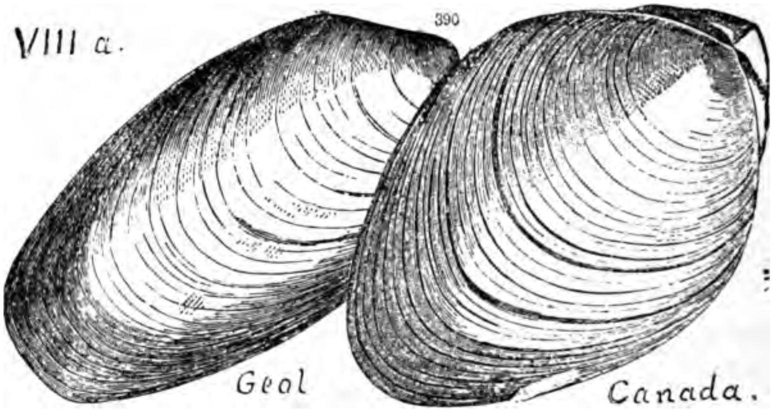
Strepula quadrilirata (*Beyrichia quadrilirata*, Hall & Whitfield, Pal. Ohio, Vol. 2, 1875, page 105, plate 4, figs. 6, 7.) Ulrich, Geol. Sur. Canada, Contrib. Micro. Camb. Sil. part 2, 1889, page 54, plate 9, fig. 12 (*given with those of S. lunatifera above*), a perfect right valve, *magnified 18 times*, from the *Hudson river formation* at Clarksville, Ohio. — Of several hundred specimens none are so square as in H. & W.'s figure. Ulrich has collected more than 50 species of *Ostracoda* from the Cincinnati *Hudson river formation*, without one example of *B. quadrilirata*, as originally figured. It is the most abundant *Ostracod* in the *upper H. R. beds* in Ohio and Indiana; also occurs in the *Birdseye* at High Bridge, Ky.; also in *Trenton* shale at *Minneapolis*. Fig. 13, shows a variety of it from Montana (*S. simplex*), occuring also in Minnesota. — Both *S. lun.* and *S. quad.* are distinct from *S. concentriea* and *S. irregularis*, Jones & Hall. *II c; III b.*

Strepula sigmoidalis, Jones & Holl. (*See figure under S. lunatifera above.*) Ann. and Mag. Nat. Hist. Vol. 17, 1886, p. 403; Q. J. G. Lond. Vol. 46, Feb., 1890, page 11, plate 2, fig. 4, *magnified 25 times*, left valve, small peculiar; Eighteen-Mile creek, Lake Erie shore, N. Y. *Hamilton*, *VIII c.*

Striatopora linnæana. Billings (1859, Canadian Journal, Vol. 5, page 253, Hamilton form.) Collett's Indiana Report of 1881, page 398, plate 47, fig. 7; fragment of a corallum. *Hamilton strata* of Canada and Indiana. *VIII c.*

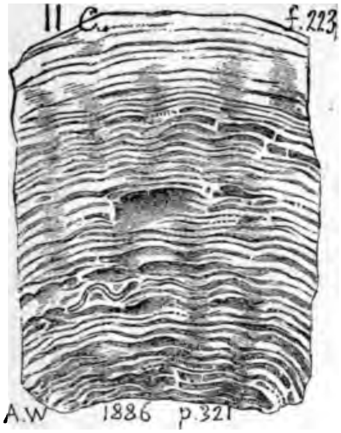


Stricklandinia (*Stricklandia*) *elongata*, Billings. See **Amphigenia elongata,** Vanuxem. (*Pentamerus elongatus*), Geol. 3d District of N. Y. 1842. Geology of Canada, 1863, page 371, fig. 390, two specimens showing the narrow and broad varieties. *Corniferous limestone. VIII a.*

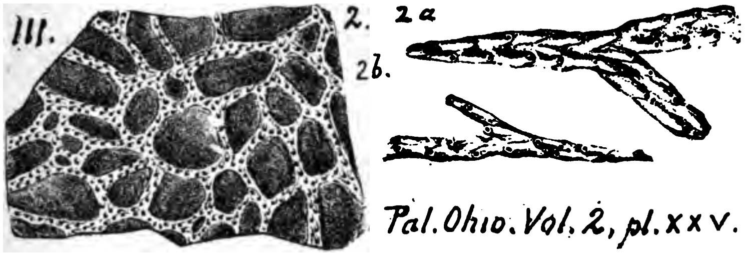


Stromatocerium richmondense. See **Strephochetus richmondensis.** *III b.*

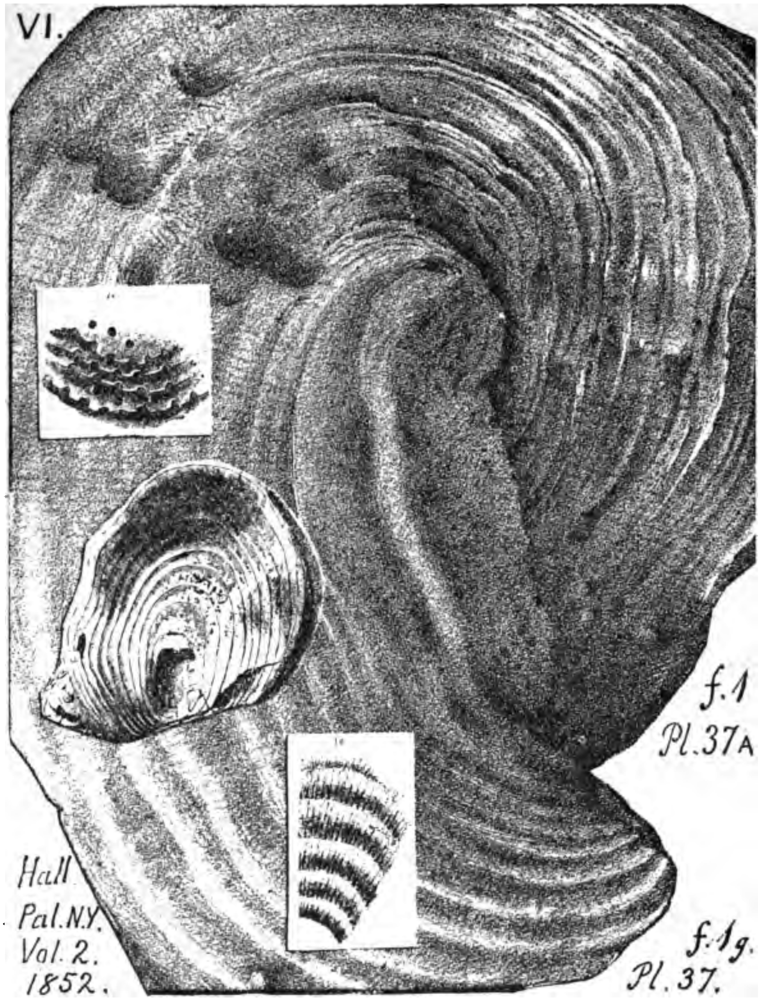
Stromatocerium rugosum. (Hall, Pal. N. Y. Vol. 1. 1847. — A. Winchell's Geological Studies, 1886, page 321, fig. 223, copied from Hall. — *Birdseye* and *Black river limestone* in New York. *II c.* — (*See Stromatopora rugosa.*) Brainard and Seely say that a massive *Stromatocerium*, with *Strephochetus*, and *Maeluria magna*, characterize the middle (B) division of the *Chazy formation* in Vermont. (Bull. Geolog. Soc. of America, 1890, Vol. 1, p. 502.)



Stromatopora auloporoides (*Alecto auloporoides*, Nicholson.) Pal. Ohio, Vol. 2, 1875, page 267, plate 25, fig. 2, *greatly enlarged*, a piece of the polyzoary growing upon a shell (*Stroph. alternata*); fig. 2 *a*, *magnified* bit of the same showing the cells in two series; *b*, bit of another branch usually regarded as identical with Hall's *Aulopora arachnoidea*, certainly distinct (Nich.). Close to *Alecto frondosa*, James, but more delicate and graceful, and with cells arranged in a single or double series (Nich.). *Cinncinati formation. III b.*



Stromatopora concentrica, Goldfuss, Germ. Petrif. 1826. Hall, Pal. N. Y., Vol. 2, 1852, page 136, plate 37, fig. 1*c*. *magnified* bit of small hemispheric mass, showing weathered laminæ, indented by the cells; *d*, cross section; *e*, ditto *magnified*; *g*, base of a layer mass, with several centers of growth. Plate 37A, fig. 2, base of a large specimen. (Other figs. on this and on plate 73 omitted.) An extremely abundant coral which grew in very thin layers, and yet piled up into masses



of one and two feet diameter, even larger than any *Catenipora*, *Heliolites*, or *Favosites* of the *Niagara limestone* (lower part) at Lockport, etc., in New York. — In Pennsylvania it is equally abundant in *Lower Helderberg rocks.* For instance, in Blair Co. collections. See Spec. 607-1 (large) collected by C. E. Hall, at the quarry north of Tyrone City, Blair Co. from *Lower Helderberg limestone* — In Huntingdon Co., abundant in the lower 50 feet of *VI.* (T, 41.) In the Aughwick valley, near Orbisonea, at the bottom, over the *Waterlime* (T3, 126); Shy Beaver section, a whole bed of it 8 feet thick makes a cliff, 200′ beneath *VII* (p. 163); on Weaver's run, Hopewell t. 260′ beneath *VII* (p. 156); Connellstown sect. 250′ (p. 198); Weaver's run sect. makes a solid bed, No. 46, 240′ (p. 123, 156, 159); Penn. t. Powell's quarry, Grafton section bed No. 4, 225′ (p. 191); Mill Cr. Jun. Sand Co.'s quarry section, 8′ bed, solid mass protruding *Stromatopora*, 125′ beneath *VII* (p. 269); Powell's quarries, coral bed 40′ beneath, and another 15′ beneath *VII* (123.) — In Bedford Co., at Dunnings' Narrows, three horizons, beds 9, 5 and 4 of Juniatia river section, 176′ to 139′ (T2, 88, 191); Hyndman sect. bed No. 47, 117′. (T2, 97,-104); Bedford sect. 100′ beneath *VII* (p. 149); at Manns quarry, and in fact throughout Bedford and Fulton Cos. everywhere plentiful at this horizon (p. 187.) — In Perry Co. Clark's mills (perhaps an *Astrocerium*) Spec. 11,814 (OOO, 129.) — In Northumberland Co., at Selinsgrove and elsewhere the same coral beds appear at the same horizon, mostly in such a broken up condition as to suggest deposits of debris from some distant living reefs (G7, 334, 336, 345, 348.) — In Montour Co., a 10 foot bed at tunnel in Cooper township; a 15′ bed at Appleman's quarries; top of Russell's quarry is a mass of coralline debris (G7, 296, 299, 300, 311, 313) — In Montour county all quarries of *L. Held. limestone show the same* (G7, 89, 96, 244, 245, 257, 260, 261, 272). — In Monroe and Pike Cos. the *Stormville limestone* shows the same beds extending into New Jersey and New York (G6, 133, 134, 219, 244). — *VI.*

Stromatopora (*Alecto*) **confusa,** Nicholson. Pal. Ohio, Vol. 2, 1875, page 267, plate 25, fig. 6, *natural size*, and also *enlarged* polyzoary forming a crust growth on a crinoidal column, closely embracing it; all specimens so; easily mistaken for

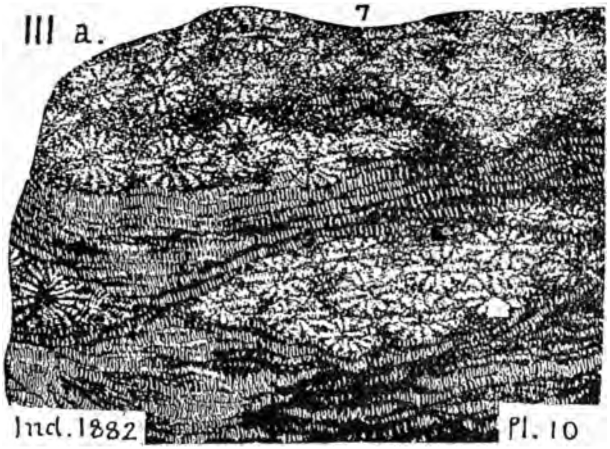
Ill. Cin. Nich

Pal: Ohio. II: pl. 25, f. 6

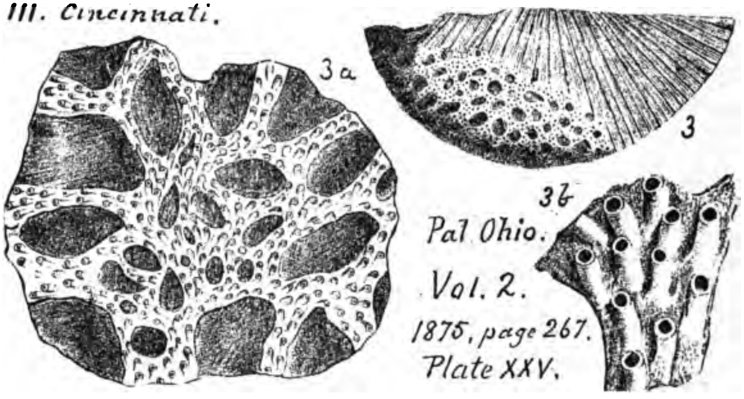
Aulopera. Cincinnati, *Hudson river strata. III.*

Stromatopora corallifera ? Perry Co., Spring township, Rice's. Spec. 12,689 (two) reported doubtfully by Claypole from *Hamilton upper* shale (OOO, 165). — *VIII c.*

Stromatopora densum. (*Syringostroma densum.* Nicholson; *Agaricia boletiformis*, (Goldfuss) Van Cleve. Collett's Indiana Report of 1882, page 263, plate 10, fig. 7, an oblique view of the specimen, showing the star-like canals of the upper surface, and the vertical structure of the mass. — Everywhere in Ohio and Indiana in the *Corniferous. VIII a*

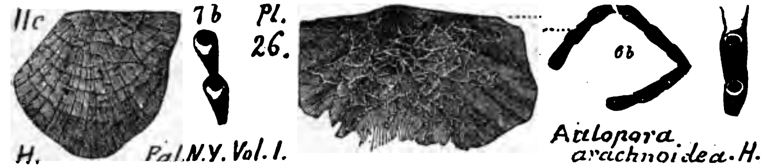


Stromatopora (*Aleeto*) **frondosa.** Nicholson. (*Aulopora fondosa*, James.) Pal. Ohio, Vol. 2, 1875, page 266, plate 25, fig. 3, *natural size*, a part of a polyzoary growing parasitically on a shell (*Strophomena alternata*); 3 *a*, *enlarged* view of a portion of it; 3 *b*, *much magnified* portion. A true *Alecto*,



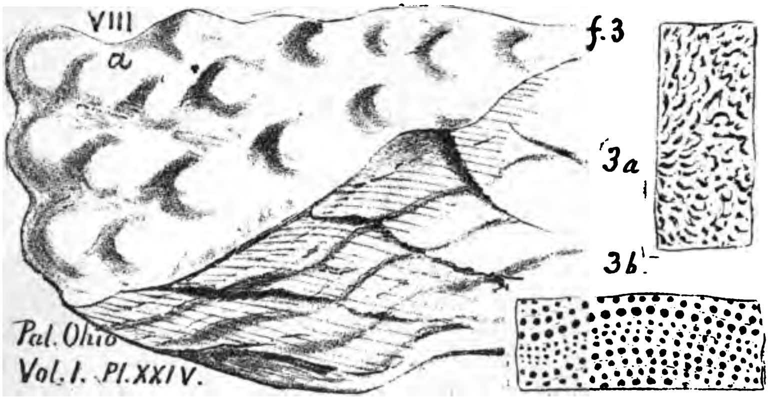
nearly allied to *A. auloporoides*, especially as to size and shape of cells; parasitic on *Orthis*, *Chætetes*, etc. At Cincinnati, in *Hudson river slate. III.*

Stromatopora inflata (*Alecto inflata*), Hall. Pal. N. Y.

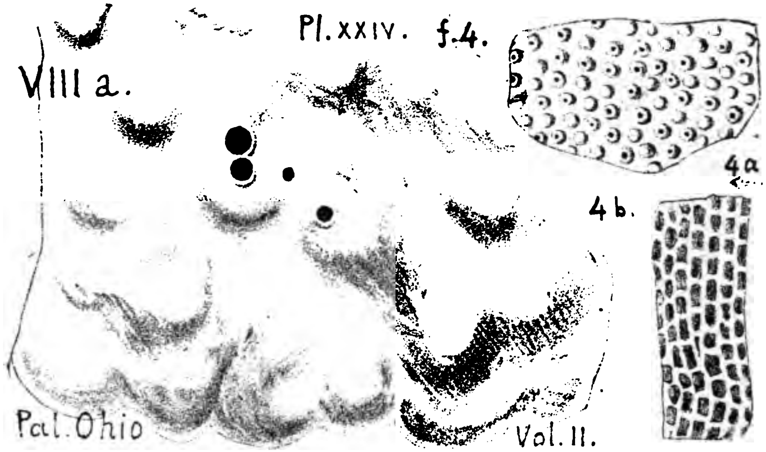


Vol. 2, 1847, page 77, plate 26, fig. 7 *a*, the coral encrusting a shell (*Lept. alternata*); *7b*, two of its tubes *magnified.* Grows like *Aulopora arachnoidea.* (See Hall's figs. 6 *a*, 6 *b*, 6 *c*, added for comparison), but its tubes are more expanded and their little mouths more distinct. Found in the central beds of the *Trenton limestone formation* at Trenton Falls, N. Y., with Trilobites and shells. (Hall.) — At Cincinnati, Nicholson finds it encrusting *Stroph. alternata*, and names it *Hippothoa inflata* (Pal. Ohio, Vol. 2, 1875, p. 268, pl. 25, figs. 1 *a*, *b*), in *Hudson river shales. II c*, *III b*

Stromatopora nodulata, Nicholson, Pal. Ohio, Vol. 2, 1875, page 249, plate 24, fig. 3, *natural size* fragments of a mass; *a*, *enlarged* surface of one of the layers composing it; *b*, *enlarged* vertical section of a fragment. Kelley's Island in Lake Erie. *Corniferous limestone. VIII a.*

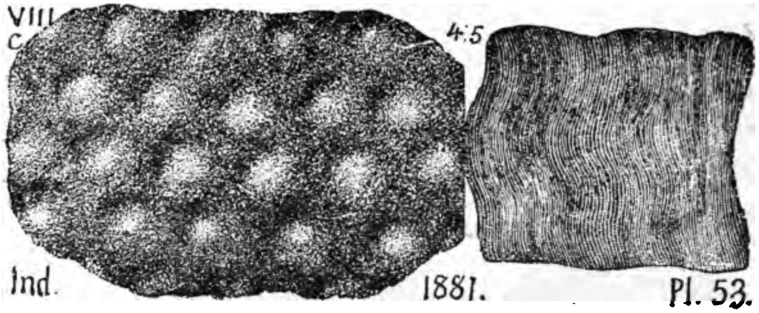


Stromatopora ponderosa, Nicholson, Pal. Ohio, Vol. 2, 1875, page 246, plate 24, fig. 4, *natural size*, part of surface of a large mass, showing apertures (oscula), but omitting the



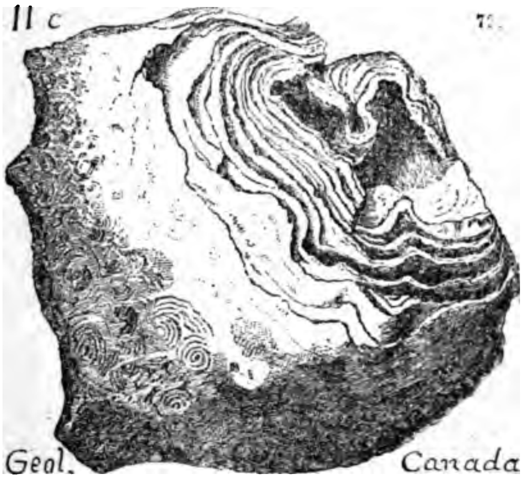
little pimples (tubercles) which cover the entire surface; 4 *a*, *enlarged* tubercles with perforated summits; *b*, *enlarged* vertical section. This remarkable species is nearly allied to *S. tuberculata*, Nich., but instead of growing as a crust over an object, it grew as a compact roundish mass; instead of being wavy, it had nipple-like protubrances; with much larger apertures (oscula) arranged in groups of two or three; its tubercles are smaller and always separate; its laminated tissue closer, and its concentric laminæ more delicate. It was surely a *sponge;* root unknown. Kelley's Island, O. *Corniferous limestone. VIII a.*

Stromatopora pustulifera ? (Winchell, 1866, Report on

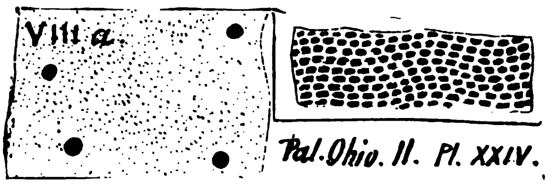


Lower Peninsula of Michigan.) Collett's Indiana Report of 1881, page 400, plate 53, fig. 4 (Van Cleve's), upper side of specimen, with its pustule-like elevations; fig. 5, cross section vertical. These pustules, however, are larger than in Winchell's *S. pustulifera*, and smaller than his *S. monticulifera*. In Michigan and Iowa, in the *Hamilton*. *VIII c.*

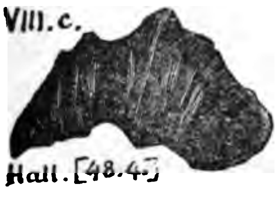
Strematopora rugosa, Hall. Figure taken from Geology of Canada, 1863, page 140, fig. 72, of a small perfect specimen from the *Trenton limestone* of Canada. Note. In S. A. Miller, 1889, p. 165, this figure is named *Stromatocerium rugosum*. *II c.*

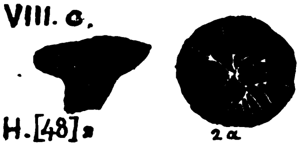


Stromatopora substriatella, Nicholson. Pal. Ohio, Vol. 2, 1875, page 248, plate 24, fig. 5, *enlarged* portion of the surface, showing oscula, and pores; *a*, *enlarged* vertical section of the same. Readily distinguished by its massive and rounded form, smooth surface, oscula widely separated, and kind of lamination. Marblehead, Ottawa Co., O. *Corniferous limestone*. *VIII a.*


VIII a.
Pal. Ohio. II. Pl. XXIV.

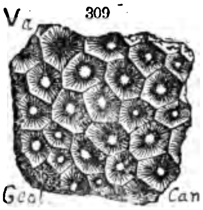
Strombodes distortus, Hall. Geology of the Fourth District, N. Y., 1843, page 209, fig. 87, 4. *Hamilton.*—Found by Ewing in Centre Co., Pa., in the same formation



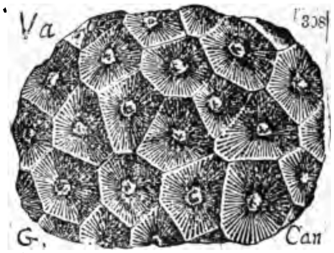


(T4, 433). *VIII c.* — Hall gives a young specimen of *Strombodes* from the *Hamilton*, in his Plate, fig. 49, 2, 2a, but without a specific name.

Strombodes gracilis, Billings. Geology of Canada, 1863, page 306, fig. 309, from the *Anticosti group* (*Clinton*, *etc.*) of the Gulf of St. Lawrence. *Va.*



Strombodes pentagonus, Goldfuss. Germ. Petrif. 1826, *Niagara*. Geology of Canada, 1863, page 306, fig. 308. *Niagara formation.* *V a.*

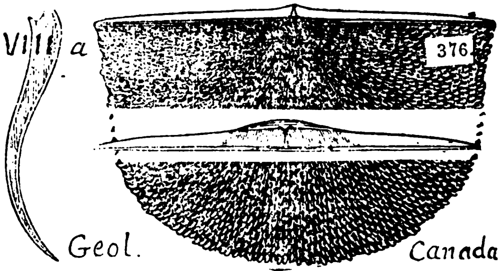


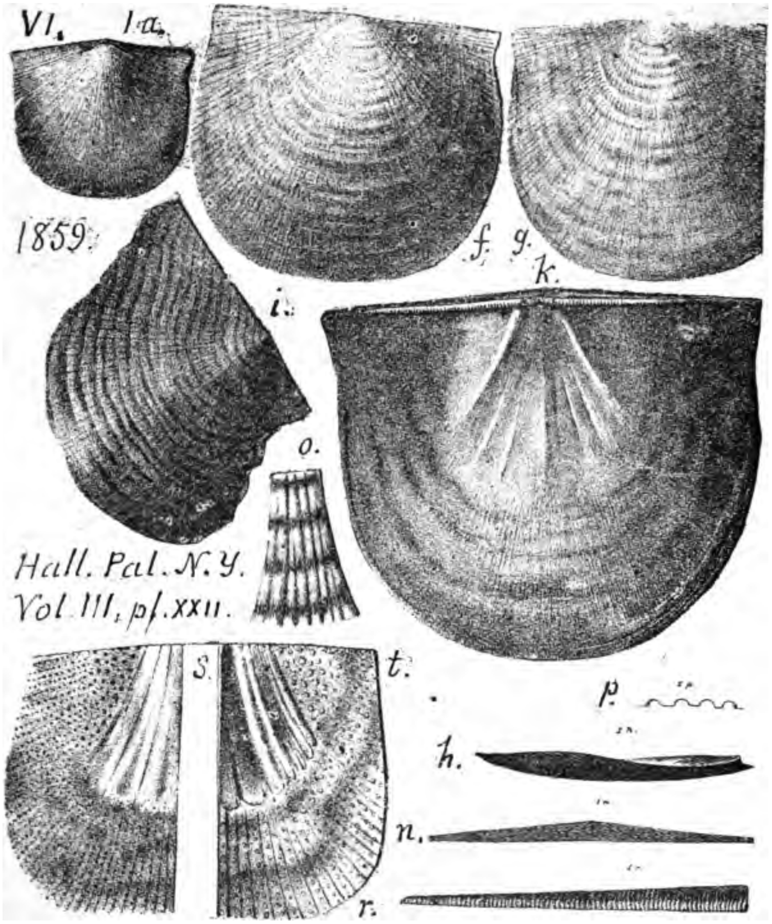
Strombodes? rectus. See **Streptelasma rectum.** *VIII c.*

Strombodes simplex. See **Zaphrentis simplex.** *VIII c.*

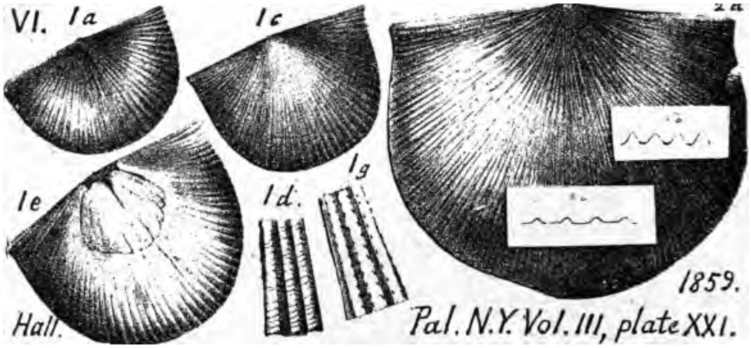
Strombodes? turbinatum. See **Heliophyllum halli.** *VIII c.*

Strophodonta (*Strophomena*) **ampla**, Hall, Geology of Canada, 1863, page 367, fig. 376*a*, dorsal valve; *b*, longitudinal section; *c*, view of area, at the hinge line; (fig. 378 omitted). *Corniferous limestone.* *VIII a* — Recognized by C. E. Hall in Carll's collections in N. W. Pa., from *Chemung rocks.* *VIII g.*



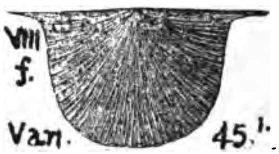


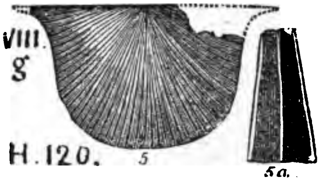
Strophodonta beckii, Hall. Pal. N. Y., Vol. 3, 1859, page 191, plate 22 fig. 1*a*, a young shell in which no corrugations have yet been developed; *f*, *g*, dorsal and ventral valves of a corrugated adult; *h*, profile of the same; *i*, an old shell with more and stronger corrugations than usual; *k*, interior of ventral valve, showing area, crenulated hinge line, and muscular scars; *n*, area of ventral valve; *o*, *p*, *enlargement* and profile of striæ; *r*, *enlarged* area, showing crenulated margin; *s*, *t*, ventral casts. A remarkable species, corrugated like *Strophomena rugosa*, but almost entirely flat, and not geniculated. Close to *S.* (*Leptæna*) *sowerbyi*, Barrande. In N. Y. in shaly limestone *Lower Helderberg.* — Recognized by Dr. Barrett in *Stormville limestone* on the Delaware. (G6, 134.) — *VI.*

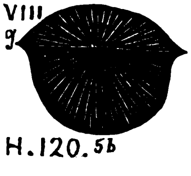


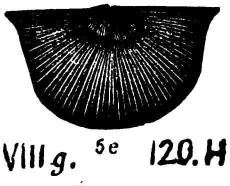
Strophodonta cavumbona, Hall, Pal. N. Y. Vol. 3, 1859, page 187, pl. 21, fig. 1*a*, ventral, and 1*c*, dorsal valve of a young shell; 1*b*, *d*, the young, striæ in profile and surface *enlarged;* 1*e*, partial cast of ventral shell; 1*g*, character of the punctate surface of a specimen exfoliated; 2*a*, well preserved dorsal adult shell, 2*c*, profile of striæ, showing the flat spaces between the elevations. Has the form and many of the outside characters of *S. punctulifera.* Young nearly flat; dorsal valve growing rounder, and ventral hollower with age. Along the Mohawk valley in *Lower Helderberg shaly limestone.* — Port Jervis, Pa. *Stormville shales.* (G6, 132.)— *VI.*

Strophodonta cayuta. (*Strophomena cayuta; Strophomena interstrialis; Orthis interstrialis; Leptæna interstrialis.*) Hall, page 266, fig. 120, 5, 5a, 5b, 5c. Phillips. Foss. pp. 61 and 216, pl. xxv, 103. —Hall, Pal. N. Y. Vol. 4, 1867. *Chemung.* Also, Vanuxem, Geol. N. Y. 1842, page 174, fig. 45, 1. *Portage.* — In Columbia Co., Pa., Rupert and Catawissa sections (G7, 69, 286) *Chemung.* — Bradford Co. LeRoy, Spec. 12,204 (OOO, 145) *Chemung.* — Tioga Co. Law-


VIII f.
Van. 45.1.

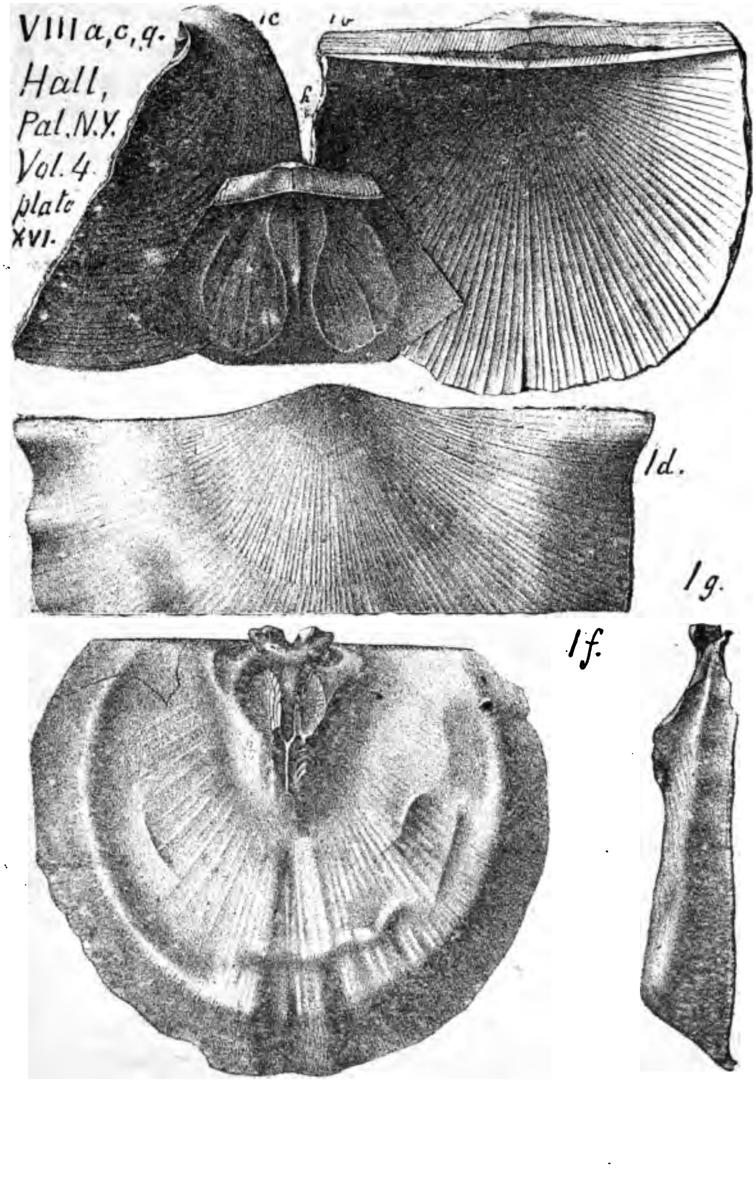






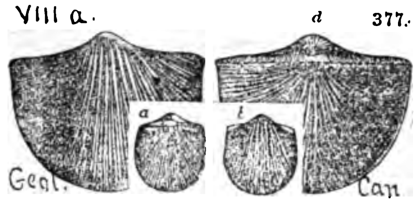
renceville, Spec. 850–7, –8, –10, –12, –23, –28; Mansfield, Spec. 860–85 (identified by J. Hall, Nov., 1888). — Nichols, Tioga Co., N. Y. Spec. 872–1 (six slabs with many individuals), –11, –15 *a*, –17 *b*, –39 *a*, –41 *b*, –45 *c*, 47 *d;* 883–41 (cast showing muscular scars), –50 *b*, –57 *a* (cast, showing scars.) *VIII g.*

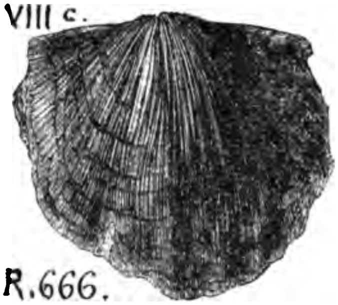
Strophodonta concava (*Strophomena concava*, Hall, 10th


VIII a, c, q.
Hall,
Pal. N.Y.
Vol. 4
plate
XVI.

Regent's Rt. 1857, *Corniferous* and *Hamilton.*) Pal. N. Y. Vol. 4, 1867, page 96, plate 16, fig. 1 *b*, dorsal view, showing the area of both valves; 1 *c*, profile of the cast; 1 *d*, large ventral valve (cut) flatter than usual, and waved at the margin; 1 *f*, interior of a dorsal valve, showing scar, hinge process, crenulated hinge line, etc., 1 *g*, profile, showing geniculation in front, and muscular scar; 1 *h*, hinge part of a ventral valve showing muscular scar and area. In N. Y. rarely in *Corniferous;* rare in *lower* and *middle Hamilton;* very common in *upper* (*Moscow*) *Hamilton shales.* — In Pennsylvania, Monroe Co., Marshall's falls. Spec. 801–6, from *Hamilton shale.* — Tioga Co., Lawrenceville, Spec. 850–17 (cast) in *Chemung* (*?*). — Perry Co., 12,846 (three), in *Ham. upper shale. VIII a; c;* (*g ?*)

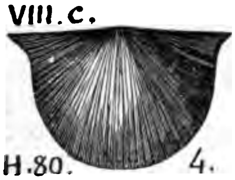
Strophodonta (*Strophomena*) **demissa.** Conrad. Jour. Acad. N. S. Phila. Vol. 8, 1842. — Geology of Canada, 1863, page 367, fig. 377, different views of two specimens, large and small. *Corniferous limestone.* — Rogers, Geology of Pennsylvania, 1858, page 827, fig. 666. *Scoharie grit*, *Corn. L.*, *Hamilton* and *Chemung.* — Monroe Co., Marshall's falls. Spec. 804–31 (with *Strophomena woolworthana*), and 807–55 (both identified by J. Hall, 1888). — In Northumberland Co., 100′ below top of *Hamilton* (G7, 76, 79, 229, 354, 359). — In Perry Co., Pine Grove, Spec. 12,282, *Corniferous* (White's *Marcellus*) *limestone;* Dilville, 12,475, *Chemung;* Newport, 11,885, *Chem.-Cats.* — *VIII-IX.*





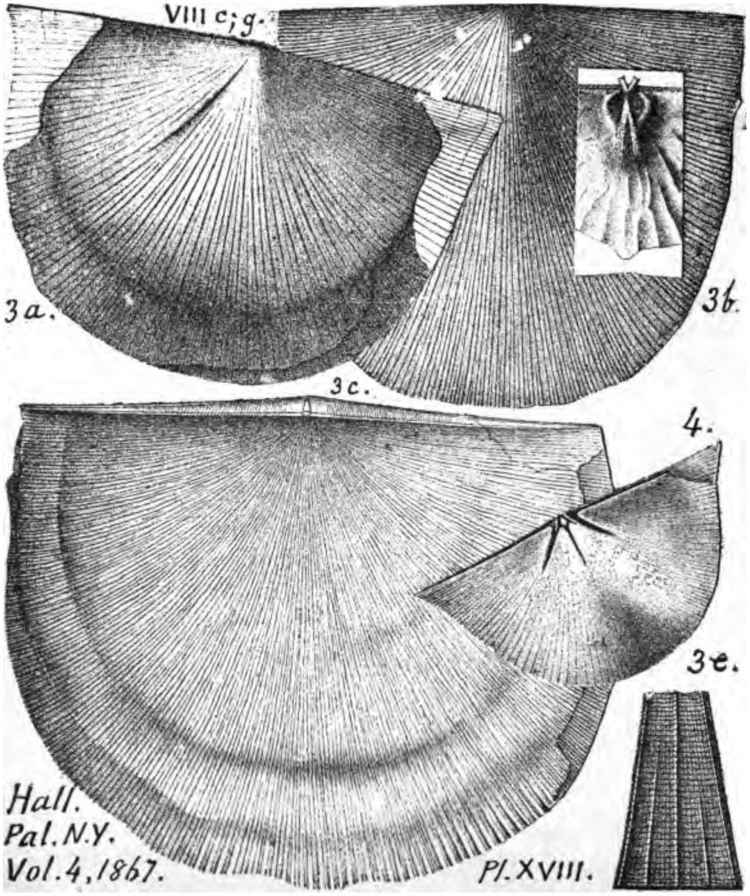
Strophodonta filitexta. See **Streptorhynchus filitextum.** See Spec. 210–97 *b* (doubtfully identified by C. E. Hall). *Trenton. II c.*

Strophodonta inequistriata (*Strophomena inequistriata.* Conrad, Jour. N. Sci. Phila. 1842, Vol. 8.) Hall, Geol. N. Y. 1843, page 200, fig. 80, 4. *Hamilton.* — In Perry Co., Pa., Barnett's mills, Spec. 11,682 (seven); and Drumgold's tannery,



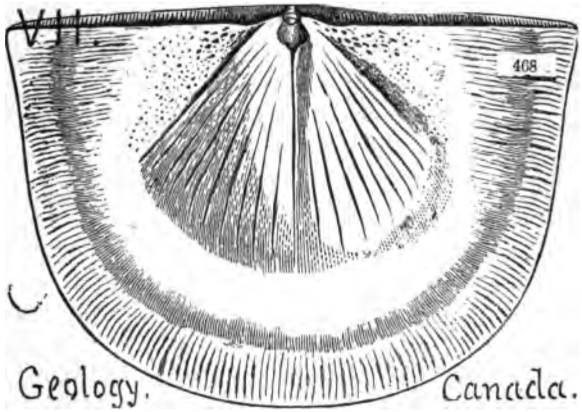
12,388 (eight); both in *Hamilton upper shales.* — In Tioga Co., Lawrenceville, Spec. 850–6 (resembles *S. nacrea*), –7 (mostly casts of interiors showing muscular scars), –8 (many specimens mostly casts of interiors), –9 (a slab holding many examples of both valves, and casts and impressions of them), –10 (with fragments of other fossil forms), –11 (a block with 20 to 30 examples), –12 (cast), 850–13, –23 (casts, and bits of other fossils), –27 (hinge line an inch long), –28 (dorsal and ventral valves, impressions and casts)—all in *Chemung strata*, *VIII g.* *See another figure under Strophomena inequistriata, below.*

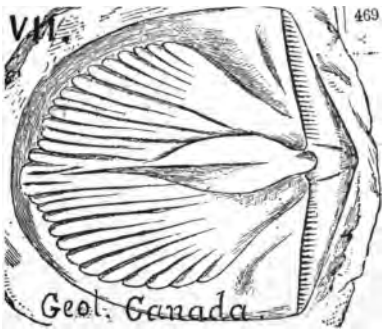
Strophodonta (*textilis*) **junia.** Hall. Pal. N. Y. Vol. 4,



1867 (corrigenda), page 108, plate 18, fig. 3 *a*, ventral valve: 3 *b*, another, longer than usual; 3 *c*, large dorsal valve, showing hinge area of the ventral valve and a narrow callosity in the center; 3 *d*, interior of a dorsal valve, showing small muscular area and slender hinge process; 3 *e*, *enlarged* striæ; 4, cast of ventral valve (apparently of this species) with long hinge line. Easily distinguished by its large size and flatness, but its striæ are like *S. inæquistriata*, and the dorsal *S. concava* and *S. inequiradiata;* the ventral scars are like those of *S. perplana*, but differently arranged, and the hinge process is longer. Found on the N. Y. lakes in *Hamilton strata*, and in *Tully limestone*. One dorsal valve was seen in the *Corniferous limestone*. — In Perry Co., Pa., Sherman's creek, Drumgold's tannery, Spec. 12,404. *Hamilton upper shales*. — Also, in Carll's collections (C. E. Hall) from *Chemung*. *VIII c, g.*

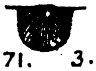
Strophodonta (*Strophomena*) **magnifica,** Hall. Tenth Reg. Rt. 1857. Fig. from Geol. Canada, 1863, page 960, fig. 468. *Oriskany*. — In Bedford Co., Pa., found by Stevenson, numerous in bed 35 and bed 37 of Hyndman section. on Will's creek, (T2. 86, 103,). *VII.*



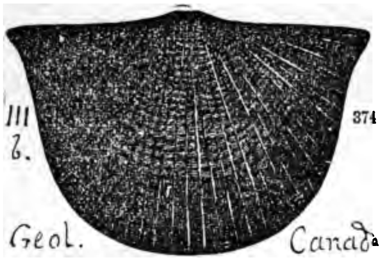


Strophodonta (*Strophomena*) **magniventra,** Hall. Tenth Reg. Report N. Y., 1857. Figure from Geology of Canada, 1863, page 960, fig. 469, *Oriskany sandstone*, *VII.*

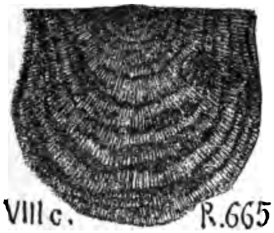
Strophodonta mucronata. (*Strophomena mucronata*, Conrad, Jour. Acad. Nat. Sci. Phila, 1842, Vol. 8. *Chemung.*) — Hall, Geol. 4th. Dist. N. Y. 1843, page 180, fig. 71, 3. *Hamilton.*

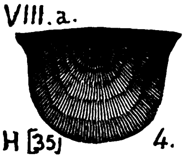


Strophodonta (*Strophomena*) **patersoni**, Hall, 10th An. Rt. N. Y., 1857. *Schoharie* and *Corniferous.* Geology of Canada, 1863, page 367 fig. 374. *Corniferous limestone. VIII a.*



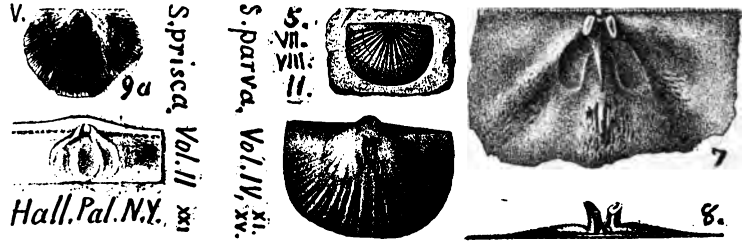
Strophodonta perplana. (*Strophomena crenistria.* Hall. Geol. N. Y., 1843, p. 171, fig. 67, 4.) Conrad, Jour. Acad. N. S., Phil. 1842. — Found by H. D. Rogers, Geol. Pa., 1858, p. 827, fig. 665, in Aughwick Valley and at Marshall's falls. — Monroe Co., (G6, 121); Spec. 804 -92 (young of *perplana?*), 804-106, 804-107 (identified by T. Hall, 1888.) *Hamilton.* — Perry Co. Claypole's collections at Centre mills, Spec. 12,818 (six), and Pinegrove, 12,279, both in *Corniferous* (Claypole's *Marcellus*) *limestone;* — at various other places, 11,631, 11,656, 11,721, 12,018, 12,395, 12,509, 12,541, all in *Hamilton upper shales;* — at Newport narrows, 12,236 (two) in his *Cardiola shale* (*Portage*) *bed;* — at Middle ridge 11,941, in *Chemung.* — In Huntingdon Co., Mapleton (T3, 109), *Ham. upper shales;* and in Aughwick Valley (H. D. Rogers). — In Blair Co., at Bell's mills, Spec. 805-8, -20 (identified by J. Hall, 1888), in *Hamilton shale.* — In Tioga Co. collections (C. E. Hall). — In Columbia Co., Bloomsburg, Specs. 12,174 (ten), 12,311, 12,372 (two) in *Stony Brook* (*Chemung*) *beds* (G7, 76, 229.) — *VIII a* (*b?*), *c*, *f*, *g*.





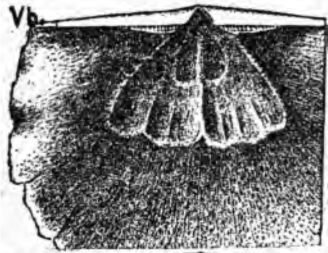
Strophodonta perplana, var. **nervosa**, Hall, Geol. N. Y., 1843, page 266, fig. 120, 1, 1*a*.—Monroe Co., Pa. Marshall's creek, Spec. 807-26 (on same slab with *Spirifera disjuncta* both identified by J. Hall) in *Hamilton.*—Tioga Co., collections of Sherwood at Mansfield, Spec. 860-7 (inside of ventral valve), 860-8 (two interiors, ventral), 860-26, -39 (casts),-87; all said by Sherwood to be in *Upper Chemung.*—In Columbia Co., Rupert sect. bed 30, *Stony brook*, *Upper Chemung.* (G7, 69, 72) — In Northumberland Co., Fiedlers' run sect. bed 28 (G7, 367.) — In Perry Co. Spec. 12,004 (three) in *Chemung. VIII c ; g.*

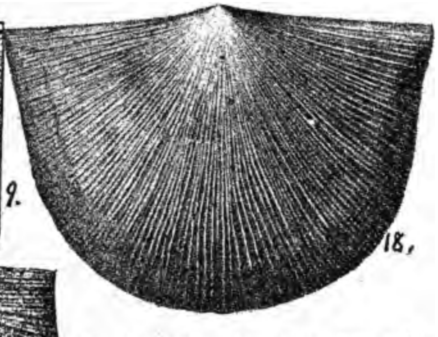
Strophodonta perplana, Var. **parva**. Hall. (16th R. Rt. 1868. *Scoharie grit ;* Not Owens' *S. parva*, Geol. Iowa, etc., 1852, *Hamilton*). Pal. N. Y., IV, 1867, page 85, plate *XI*, fig. 5, imp. of dorsal valve; 11, *enlarged twice*, cast of ventral valve showing crenulated hinge. Also plate, 15, fig. 7, dorsal interior, 8, hinge. Form and proportions like S. *callosa*, with stronger striæ, different scars, etc. *Schoharie grit* in N. Y.—Called by Claypole "a new variety" (see Cat. OOO. 138.) Perry Co., New Bloomfield, Spec. 12,001; 12,568; 12,581; also, Pinegrove, 12,563 (called S, *parvula.*) All in *Chemung. VII b : VIII g.*

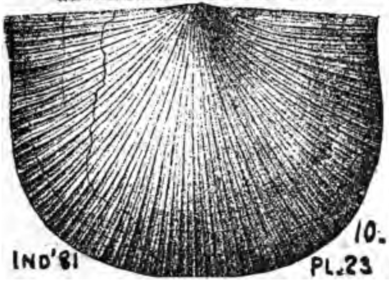


Strophodonta prisca, Hall. Pal. N. Y. Vol. 2, 1852, plate 21, 9 *a*, *b* (*included in figure cut under S. perplana, var. parva above*), *natural size* of shell, and *enlarged* hinge line. Occurs with *Leptæna orthididea* and *L. depressa* in laminated sandy iron shales holding *Clinton fossil ore bed.* Mentioned by C. Hall as among his collections in Ferguson Valley, Mifflin Co. (Proc. A. P. S. Phil. Jan. 5, 1875). *V a.*

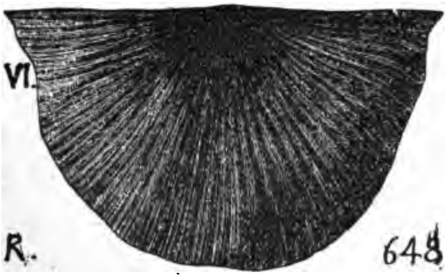
Strophodonta profunda (*Leptœna profunda*, Hall. Pal. N. Y. Vol. 2, 1852, page 61, pl. 21, fig. 4. *Niagara.*) Hall, in Collett's Indiana Report of 1881, page 289, plate 23, figs. 9, 10, plate 24, fig. 18. *Niagara.* — In Mifflin Co., Pa., at McKeysville, Spec. 501–14 *b;* and at Matilda furnace Spec. 507–21; both in limy shales over the *Clinton fossil ore. Va; V b.*

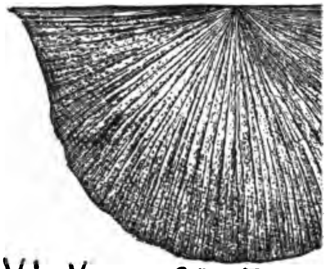


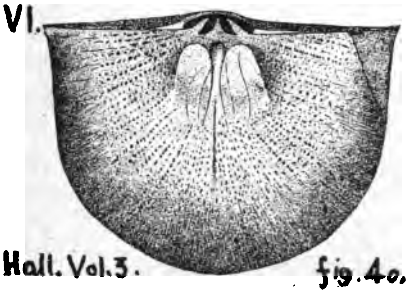




Strophodonta punctulifera (*Strophomena;* also *Leptœna punctulifera.*) Rogers, page 825, fig. 648. Vanuxem, page 122. Hall, plate —, fig. [28, 1]. (Conrad, Annual Report, N. Y., 1838.) Logan's Geol. Canada, 1863, fig. 448. In *Lower Helderberg.* Recognized by Dr. Barrett, on the Delaware, in White's *Stormville limestone* (G6, 134.) *VI.*

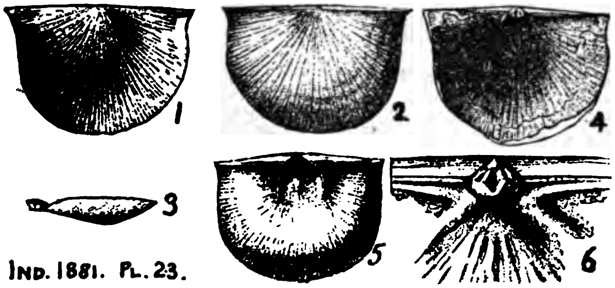



VI. Vanux. 22, 5.


VI.
Hall. Vol.3.
fig. 40.

Strophodonta rhomboidalis. See **Strophomena rhomboidalis.** Collected by C. E. Hall, at Marshall falls, Monroe Co. *VIII b*, (*e.*?)

htrophodonta striata (*Strophomena striata*, Hall, Geol. Fourth Dist. N. Y. 1843; which see below.) — Hall in Collett's Indiana Report 290, plate 23, figs 1 to 6 *Niagara.* — In Mifflin Co., Pa., at McKeesville and Matilda furnace mines, Specs. 501-7, -20, -44; 502-3, -45*a;* 503-10, -11, -16; 504-2, 505-45; 507-7, -8, -11, -13, -13, -19, -21, -24; 508-5, in shales over *Clinton fossil ore bed.* — In Perry Co. at the Millerstown mines, Spec. 12,678, in *same.* — In Blair Co. at Bell's Mills, Specs. 506-1, -2*b*, -3, -13 (peculiar for its fine striation; it may be a *new species.* G. B. Simpson) in *Clinton shale. V a.*

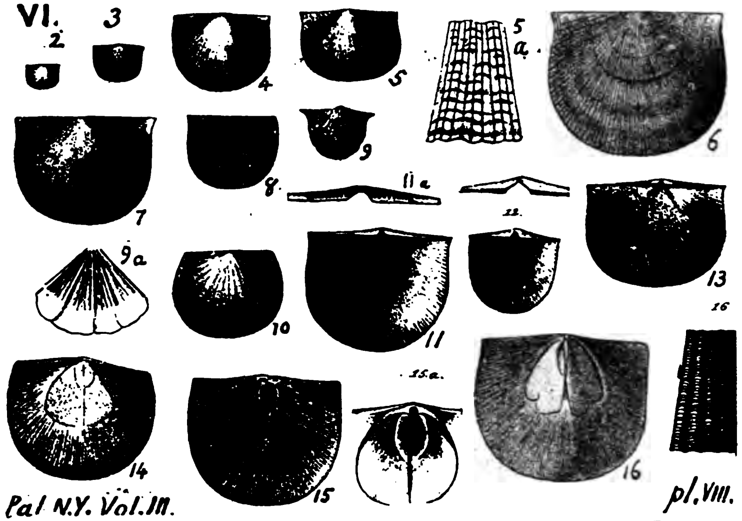


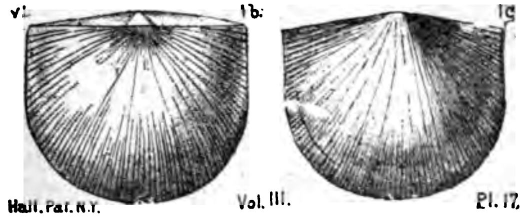
IND. 1881. PL. 23.

Strophodonta textilis. See **Strophodonta junia,** Bill. *Mid. Silurian.*

Strophodonta (*Strophomena*) **varistriata** Conrad, Jour. Acad. Sc. Phil. Vol. 8, 1842; *S. rectilateris*, Con.; *S. impressa* Con.; *Leptœna indenta*, Con.); Hall, Pal. N. Y. Vol. 3, page 180, pl. 8, f. 2 to 6, ventral valves with striæ nearly equal or of alternate sizes; 7, 8, varying surface characters; 9, young shell; 5 *a*, *enlargement* of its surface; 10; 11, ventral inside; 11 *a*, its area, etc., *enlarged;* 12, 12 *a*, ditto; 13, ditto; 14, 16, ventral inside casts; 15, 15 *a*, ventral inside and *enlargement;* 16 *a*, *much enlarged* surface striæ. (On plate 16, are eight other figures, chiefly of *enlarged* striæ.) All from *Tentaculite limestone* layers on the Mohawk; extremely abundant, and of very various aspects; much like *Strophomena alternata* of the *Trenton limestone.* — On the Delaware river recognized by

Barrett in White's *Stormville limestone* (G6, 134). — In Perry Co. Spec. 12,805, from the *Chert* beds at the top of *VI.*





Strophodonta woolworthana (*Streptorhynchus woolworthianus.* in Miller's Cat. Pal. Foss.) Figures re-drawn from Hall Pal. N. Y. Vol. 3, p. 192, pl. 17, figs. 1 b, 1 c. — Stevenson reports it from the chert beds of Pine ridge, Bedford Co., Pa., King township, on the Beaver dam run road (T2, 134), at the top of the *Lower Helderberg.* — Jas. Hall identified it (Nov., 1888) in Spec. 608–1 (eighteen), -2 (two), -9, from Pike Co., Pa., north slope of the Hogback, below mouth of Bushkill creek (OOO, 206). *VI.* — Jas. Hall identified it also in Spec. 804–31 (cast), from Monroe Co., Pa., Marshall's falls. *Hamilton. VIII c.*

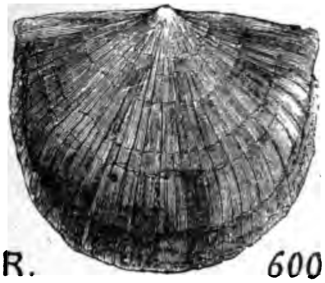
Strophodonta - ? in *Trenton limestone*, at Bellefonte, Pa. Spec. 210-152 (strongly nodose, with concentric striæ.) *II c.*

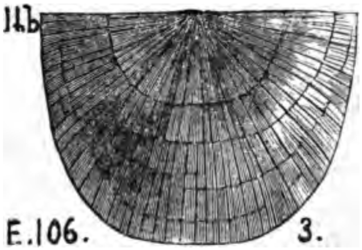
Strophodonta - ? in *Trough creek limestone*, middle layers, Huntingdon Co. (T3, 77), bottom of red shale formation, *XI.*

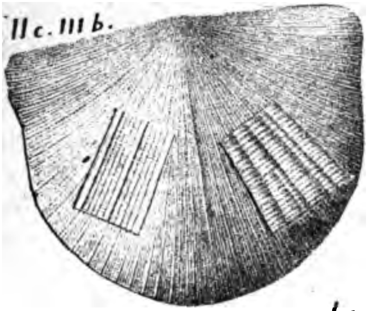
Strophodontas and *Productellas* in *Pocono sandstone.* Crawford Co. Spec. 3258. (O, 146.) — See also Spec. 3180; 3139.

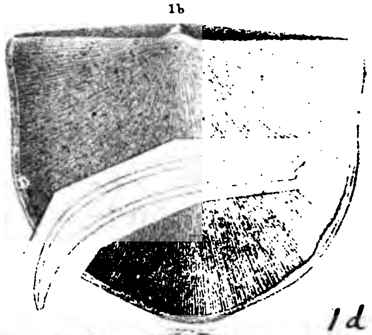
Strophomena acutiradiata. See **Chonetes acutiradiata.** *VIII a.*

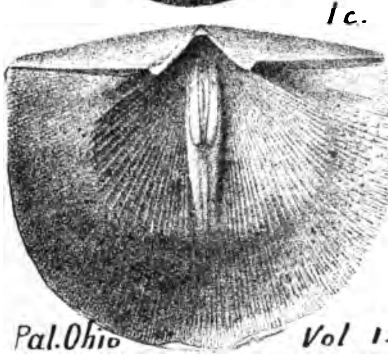
Strophomena alternata. (*Leptœna alternata*, Conrad, Ann. Rept. N. Y., 1838, *Trenton*, and *Hud. River*.—Emmons, Geol. 2d. Dist. 1842, fig. 106, 3.—Rogers, Geol. Pa. 1858, pp. 818,

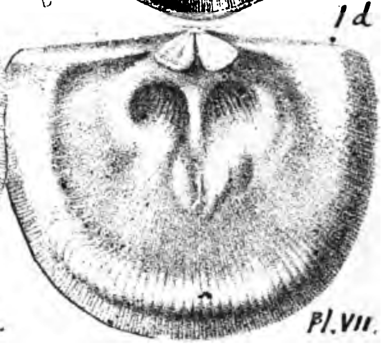


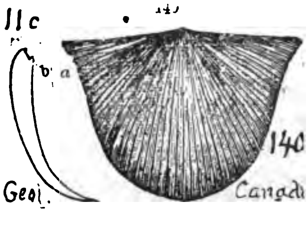


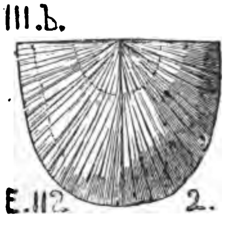






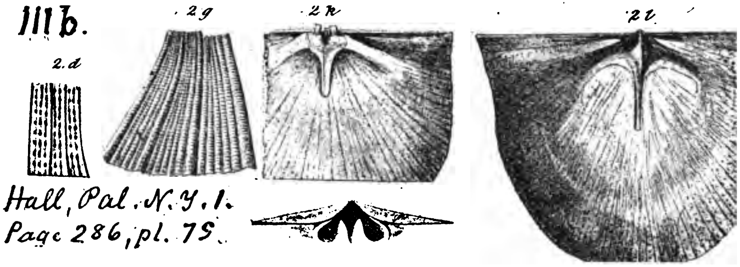


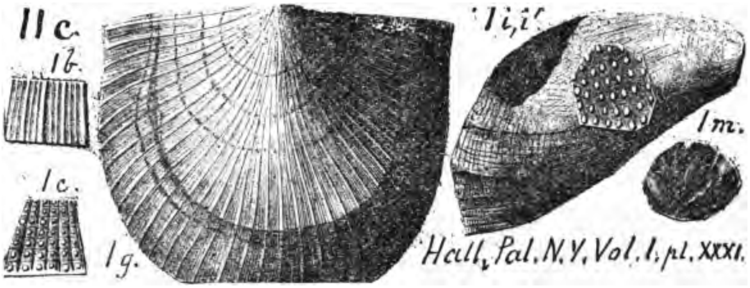




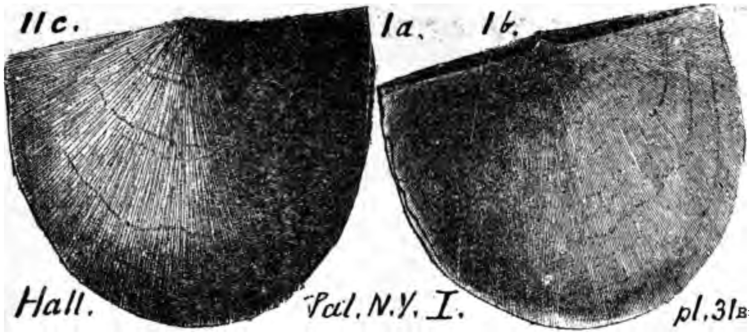
820, 820, fig. 600. *Hud. Riv.* and *Clinton.* — See also Emmons' fig. 112, 2, *Hud. Riv.* — Logan's Geol. Canada, 1863, fig. 140 *a*, ventral valve; *b*, section of both shells, fitting to each. *Trenton.* — Pal. Ohio, Vol. 1, 1873, page 88, plate 7, fig. 1*a*, *b*, ventral and dorsal valves; *c*, *d*, interiors of ventral and dorsal valves; *e* section of valves united; *f*, *magnified* striæ; *g*, *still more magnified* to show small crowded lines of growth. — All parts of the U. S. in *Trenton* and *Hudson river uppermost beds.* — (Recognized in Russia.)—In Pennsylvania, colonies of this shell may be seen in the *Trenton limestone* quarries on the Delaware river, at Howell's cotton mill, in Northampton Co. (D3, 162).—Crowds of them occur in some of the *Trenton limestone beds* along the Little Juniata river in Huntingdon Co. and at Bellefonte in Centre Co. (T3, 367; T4, 424). — In Bedford Co., Stevenson found it in one of the highest *Trenton beds* in Friend's cove. (T2, 94, 163, 164). — In Mifflin Co., C. E. Hall collected it (as did H. D. Rogers) from the *Trenton* beds of Kishicoquillis valley. — In the collections from Bellefonte: Specs. 203–9, –24, –27 (all fragments); 210–2 (four dorsal interiors, fair), –5 (convex valves), –20, –24, –25 (all poor), –33 (a good ventral valve), –46*a* (two fairly good), –51*a*, –54*a* (poor), –59 *b*, (ventral, fair), –60 (very good), –62*d* (several gibbous specs. fairly good), –72*b*, –77*b* (very good slab), –78*a*, –80 (ventral, fair), –84 (good), –86, –88, –95, –97*d*, –126 (a good slab), –127, –129 (broken), –133 (sixteen fair specs.), –140 (four young shells), –146*a*, 149*a*. — From Reedsville, Mifflin Co. Spec. 204 –3, –6, –18 (good.)—From Tyrone forges, Hunt. Co., Spec. 212 –8 (*with Trinucleus concentricus.*)—*IIc.* — It is also reported from the *Hudson river slate formation* both by H. D. Rogers, Prof. Ewing, and C. E. Hall, (Proc. A. P. S.) in Nittany and Kishicoquillis valleys; see Claypole's specs. 11,863, 11,864 (two; with *Leptæna sericea* and *Orthis testudinaria*) at Thunder hill near Lewistown (OOO, 132). Compare Stevenson's report of it in Soft red sandstone near Summit of road over Evitt's mountain (T2, 170), probably in the lower part of the *Medina red rocks*, which in that region rest on *Hudson river.* *IV b.* — In the Montour region it is found both in the *Clinton fossil ore bed*, and in the *Clinton upper shales* (G7, 113, 231, 232, 252, 341). In Mifflin Co., at McKeesville and Matilda furnace, and in Huntingdon Co., at Orbisonia, in the *Clinton shales* over the ore; Specs. 501; 502; 503; 504; 507 (?); 508; many specimens were at first named S. *alternata*, now recognized as S. *striata*, one as S. *profunda*, and two as Simpson's new species S. *cuneata*. It is probable that the Montour specimens must also be renamed.—

Hall, Pal. N. Y., Vol. 1, 1847, page 286, plate 79, selected figs. 2*d*, surface, *enlarged*, to show its striato-punctate character; 2*g*, surface *enlarged;* 2*k*, ventral interior showing two small teeth and three diverging callosities; 2*l*, mould of ventral interior showing the cavities made by the two small teeth, and impressions of radiating callosities. Specimens from the *Hudson river formation* differ often from those of the *Trenton*; but an examination of several hundred convinced Hall that the species is the same.—Abundant in Ontario Co., N. Y., near Rome, and elsewhere.—*Trenton* specimens are figured by Hall on plates 31 and 31 A, from which I select the following: fig. 1*b*′, *enlarged* surface of a very characteristic specimen; 1*c*′, ditto of another specimen; 1*i*, (= *Leptœna ponderosa* of Ohio) side view; 1 *m*′, *enlarged* view of a coral which partially covers the interior of a specimen. This variable species is equally abundant in the *Blue limestone* of Ohio and other Western states. (Hall.)





Strophomena (*Leptæna*) **alternistriata,** Hall, Pal. N. Y.

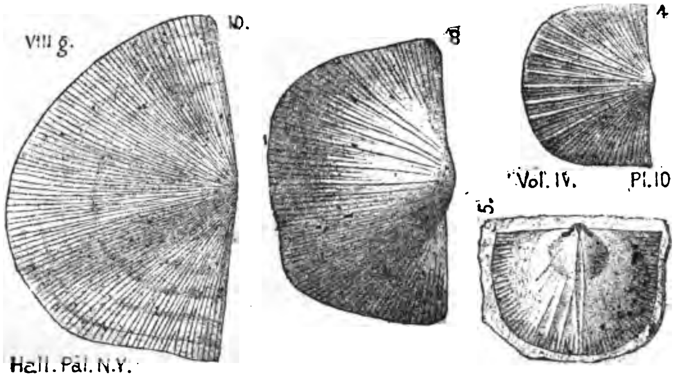


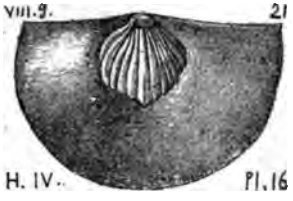
Vol. 1, page 109, plate 31 B, fig. 1 *a*, large dorsal valve with regularly alternate striæ; 1*b*, a ventral valve, with regular and uniform striæ. Much as this is like *S.* (*L.*) *alternata*, Hall says he could find no gradations from one species into the other. He adds that this species is not well characterized in the New York *Trenton*, but is not rare in the *Blue limestone* at Cincinnati, and other western places. *II c. III b.*

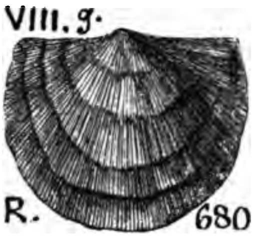
Strophomena analoga (*Producta analoga*, Phillips.) Dawson's Acad. Geology, 1868, page 296, fig. 95, one clear specimen of this British *Carboniferous* shell, mistaken by Lyell for a *Productus martini.* (Davidson.) *XIII.*

S. bifurcata. See **Streptorhynchus pectinaceus.** *VIII g.*

Strophomena chemungensis, Conrad, 1842. Jour. Acad.



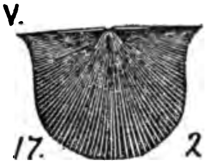

VIII.g.
21
H. IV.
Pl.16



Nat. Sciences, Phil. Vol. 8, 1842. Figures re-drawn from Hall's Pal. N. Y. Vol. 4, pl. 10, fig. 4, 5, 8, 10; plate 16, fig. 21. Rogers, Geol. Pa. 1858, page 829, fig. 680. — Recognized by Ewing in Centre Co., Pa. (T4, 433). *Chemung. VIII g.*

Strophomena conradi, Hall, Pal. N. Y. Vol. 3, 1859. *Lower Helderberg.* — Recognized on the Delaware, by Dr. Barrett, in White's *Stormville shales* (G6, 132). *VI.*

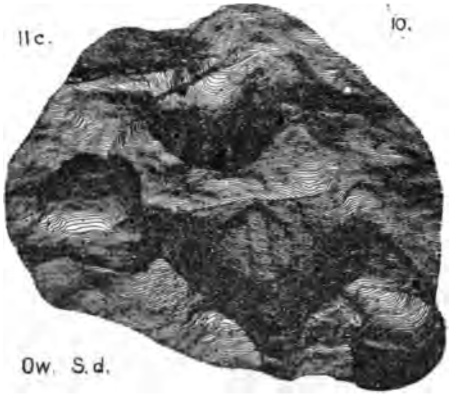
Strophomena cornuta. See **Chonetes cornuta.** *V a.*

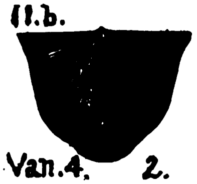


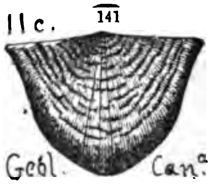
Strophomena corrugata. Conrad, Journal Acad. Nat. Sci. Phila. Vol. 8, 1842. — Hall, Geology of the Fourth District of New York, 1843, page 72, fig. 17, 2. *Clinton formation. V a.*

Strophomena crenistria. See **Strophodonta perplana.**

Strophomena deltoidea, Conrad. Ann. Rt. N. Y. 1839, *Trenton.*— Emmons, Geol. 2d Dist. fig. 4, 2, *Trenton.* — Owen. Geol. Wisc. 1852, plate 2 B, fig. 10, Falls of St. Anthony, *Shell beds.* — Logan. Geol. Canada, 1863, fig. 141. *Trenton.* Reported by C. E. Hall from Nittany Valley, Pa. *VI.*

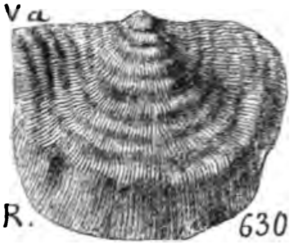






Strophomena demissa. See **Strophodonta demissa.** *VIII, a, c, g.*

Strophomena depressa (*Producta depressa*, Sowerby, Min. Chon. Vol. 6, 1825, English *Upper Silurian.* Sil. Res. p. 623, plate 13, fig. 2. — Trans. Swedish Acad. Vol. 1, page 106, fig. 2. — *Leptæna depressa*, Hall, Geol. N. Y. 1833, page 77, fig. 19, 5. — Vanuxem, Geol. N. Y. 1842, page 79, fig. 11, 5. *Clinton.* — Hall, Geol. N. Y. page 104. fig. 35, 2. *Niagara.* — In Columbia Co. Pa., in *Clinton upper shales* (G7, 231); also, in Mifflin Co., McKeesville, shales above fossil ore bed (Specs. 501–13, –31). *V a.* — In Northumberland Co. Fiedler's cr. in *Bastard limestone* up to *Stormville* shales (G7, 14, 101, 248, 374; also Spec. 12,299), *Lower Helderberg. VI.* — Near Northumberland, in *Tully limestone* (White's G7, 339). *VIII d.*



Strophomena elegantula. Hall, Geology Fourth District New York, 1843, page 72, fig. 17, 1. (Not either *Leptæna sericea*, nor *L. transversalis*. Hall.) *Clinton formation. V a.*

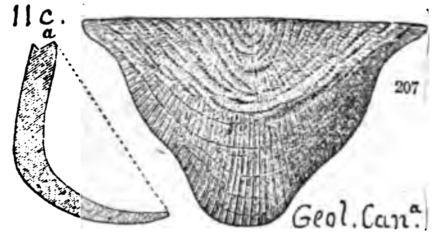
S. elongata, Con., J. A. N. S. VIII, 1842. *VI.*

S. elliptica, Con., An. R. N. Y. 1839. *Niag. V b.*

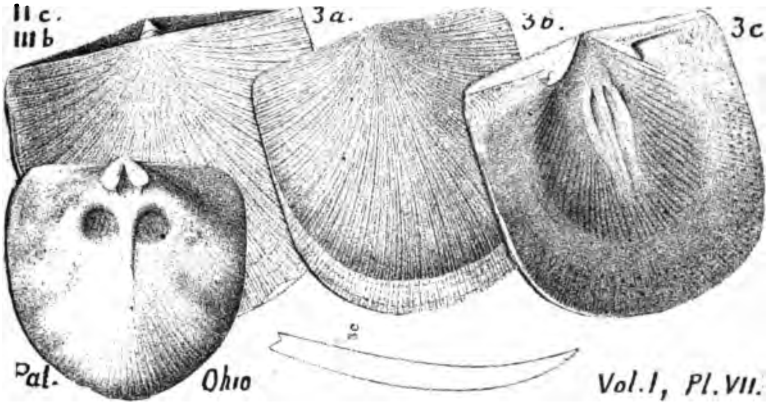
Strophomena fasciata. (*Leptæna fasciata.* Hall, Pal. N. Y. Vol. 1, 1847, *Chazy.*) — Emmons, Amer. Geol. Vol. 1, part 2, 1855, page 235, plate 3, fig. 24; somewhat punctated; striæ fork near the margin. — *Chazy limestone formation. II b.*

Strophomena filitexa. See **Streptorhynchus filitextus,** *II c, III b.*

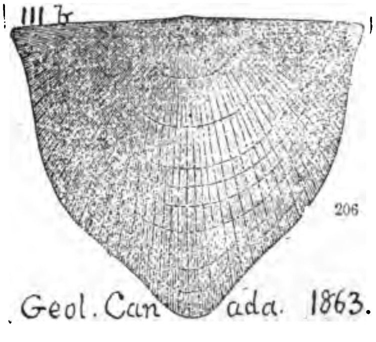
Strophomena fluctuosa, Billings. Canadian Naturalist, Vol. 5, 1860. *Trenton* and *Hudson river* formations. Geology of Canada, 1863, page 209, fig. 207 *a*, longitudinal section. *Hudson river. II c, III b.*


II c.
a
207
Geol. Canª.

Strophomena (*alternata*, var.) **fracta,** Meek, Pal. Ohio, Vol. 1, 1873, page 91, plate 7, figs. 3 *a*, dorsal, large specimen; *b*, ventral, of another showing the second growth, often seen; *c*, inside of same; *d*, inside of a smaller ventral valve showing forked hinge process, and scars wider apart; *e*, section. Generally in U. States. *Trenton* and *Hudson river. II c, III b.*

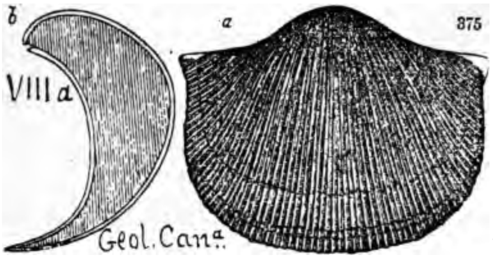


Stropomena hecuba, Billings. Canadian Naturalist, Vol. 5, 1860. *Hudson River.*—Geology of Canada, 1863, page 209, fig. 206, *Hudson* (*Loraine*) *formation. III b.*



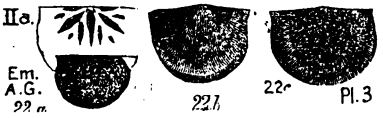
Strophomena impressa. **Strophodonta varistriata.** *VI.*

Strophomena inequistriata, Conrad. Geology of Canada, p. 367, f. 375 *a*, ventral valve; *b*, longitudinal section. *Corniferous limestone. See another figure under* **Strophodonta inæquistriata,** *above.* — *page* —. — In Columbia Co., Pa., 100′ beneath the top of the *Hamilton* (G7, 229); and in Perry Co., (Spec. 11,682, seven) in *Hamilton upper shale. VIII a; VIII c.*

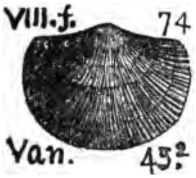


Strophomena incrassata (*Leptæna incrassata*, Rogers, page 817, fig. 591. *Chazy.* Hall, Pal. N. Y. Vol. 1, 1847. *Chazy* up to *Hudson river.*) — Rogers, Geology of Pennsylvania, 1858, page 817, fig. 591. *Chazy.* — C. E. Hall, Mifflin Co., *Chazy. II b, III b.*

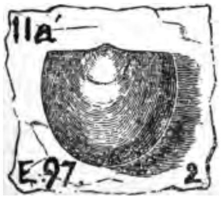
Strophomena insculpta. (Hall), Emmons, Amer. Geol. Vol. 1, part 2, 1855, page 235, plate 3, figs. 22 *a*, *b*, *c*; striæ sharp, raised. — First appears in top of *Calciferous;* more abundant in *Chazy* limestone formation. *II a, b.*



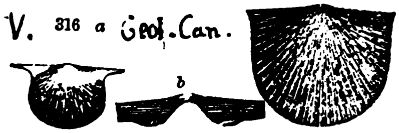
Strophomena interstrialis. See **Strophodonta cayuta.**



Strophomena ithacensis. Vanuxem, Geology of Third District of New York, 1842, page 174, fig. 45, 2. *Portage formation. VIII f.*



Strophomena lævis, Geology of the Second District of New York, 1842, page 385, fig. 97, 2. *Birdseye limestone formation. II c.*



Strophomena leda, Billings. Canad. Naturalist, Vol. 5, 1860. Geology of Canada, 1863, page 311, fig. 316, *a*, ventral valve; *b*, *enlarged* view of spinous teeth in the hinge of the ventral valve; *c*, specimen without ears supposed to belong to this species. *Clinton. V a.*

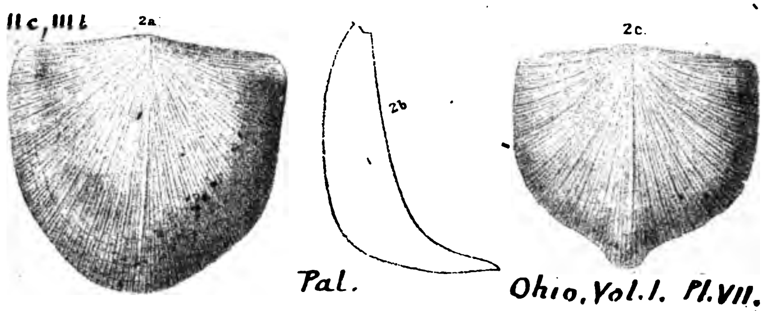
Strophomena lineata. See **Chonetes lineata.** *VIII a.*

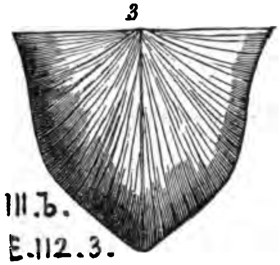
Strophomena membranacea. See **Productella hirsuta,** var. **rectispina.** *VIII g.*

S. modesta, Con. An. Rt. N. Y. 1839. *Niag. Vb.*

Strophomena mucronata. See **Strophodonta mucronata.** *VIII b.*

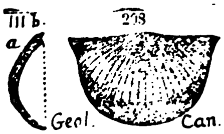
Strophomena (*alternata, var.*) **nasuta,** Conrad, Jour. A. N. S. Phila. 1842, — Pal. Ohio, Vol. 1, 1873, page 90, plate 7, fig. 2*a*, ventral valve; *b*, section of shell, the valves united; *c*, ventral view of smaller specimen, the nose-like extension of the margin strongly expressed. United States and Canada. *Trenton* and *Hudson river*, *II c, III b.* — See *S. nasuta,* Emmons, Geol. Second Dist. N. Y., page 403, fig. 112, 3. *Hudson River. III b.*


II c, III b
2a
2b
2c
Pal. Ohio, Vol. I. Pl. VII.


3
III.b.
E.112.3.

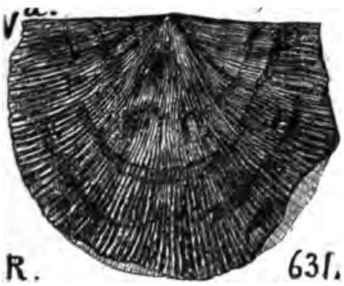
Strophomena nervosa. See **Strophodonta perplana.** *VIII g.*

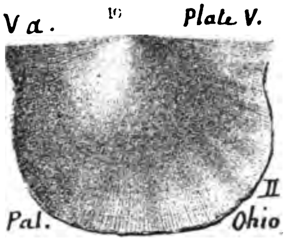
Strophomena nitens, Billings. Canadian Naturalist, Vol. 5, 1860. Geology of Canada, 1863, page 209, fig. 220 *a*, section through both valves, lengthwise. *Hudson river formation.* *III b.*



Strophomena nutans. See **Stroptorhynchus nutans.** *Va*

Strophomena (*Leptœna*) **patenta,** Hall, Pal. N. Y, Vol. 2, 1852, *Clinton.*— Rogers, Geol. Pa., 1858, page 823, fig. 631 — Pal. Ohio, Vol. 2, 1875, page 115, plate 5, fig. 10, ventral valve, got by guttapercha cast of impression in the rock. One of a group of *Strophomenoid species* characterized by having young ventral valves convex, older or adult ones doubly bent, and often deeply concave. Much like *Streptorhynchus* (Silurian species) but differs in having a double curvature; which, for example, distinguishes this *S. patenta*, from *Strept. subplana*, found with it. Dayton, O. *Clinton limestones.* *V a.*

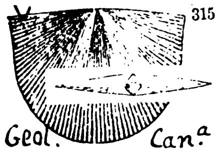




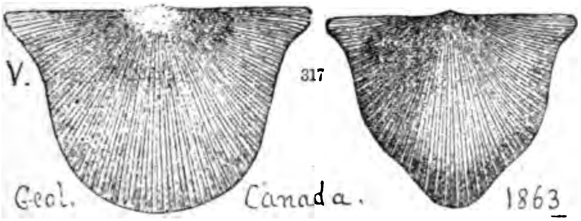
Strophomena planoconvexa, see **Streptorhynchus planoconvexum,** *III b.*

Strophomena planumbona, See **Streptorhynchus planumbonum,** *III b.*

Strophomena (now **Anomia**) **pecten,** Linneus, Syst. Nat. 1758. *Niagara limestone.* Geology of Canada, 1863, page 311, fig. 315 *a*, ventral valve; *b*, hinge view. In Logan's chapter on West Canada *Medina* and *Clinton* formations. *V?*



Strophomena pectincea. See **Streptorhynchus pectinaceum.** *VIII g.*



Strophomena philomela. Billings. Geology of Canada, 1863, page 311, fig. 317 *a*, *b*, two specimens of different forms, given in Logan's chapter on the *Medina* and *Clinton strata* of Western Canada. *V?*

Strophomena plicata, James. See **Streptorhynchus subtentum.** *III b.*

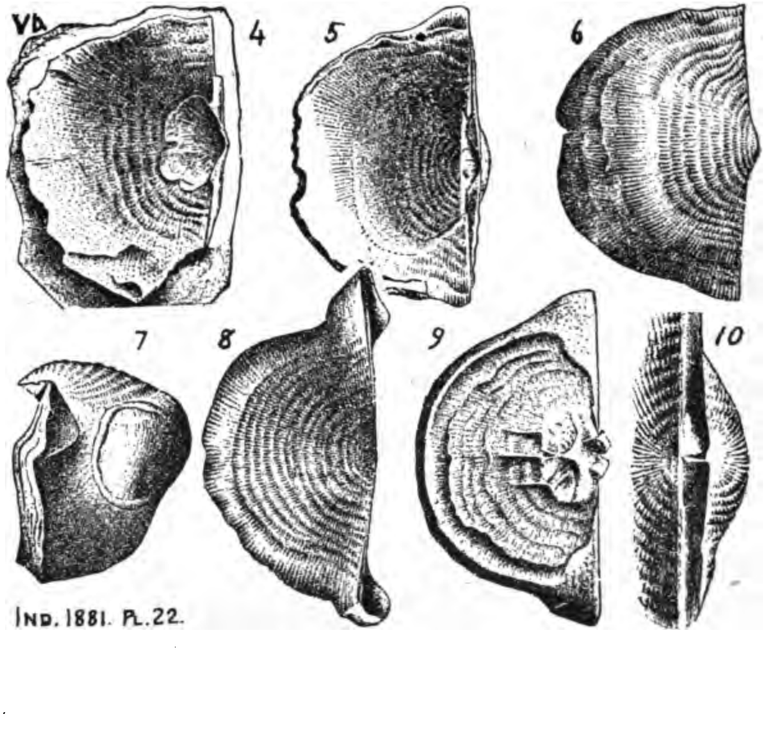
Strophomena punctulifera. **Strophodonta punctulifera.** *VI.*

Strophomena pustulosa. See **Productella truncata.** *VIII b.*

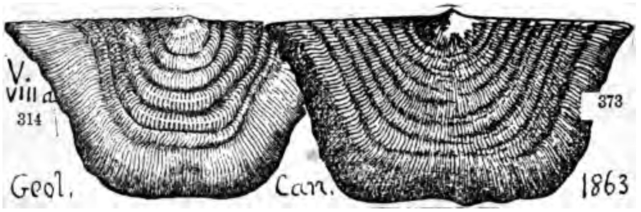
Strophomena radiata. **Streptorhynchus radiatum.** *VI.*

Strophomena rectilateris. Con. See **Strophodonta varistriata.** Hall, *VI.*

Strophomena rhomboidalis (with its varieties *Stropho-*



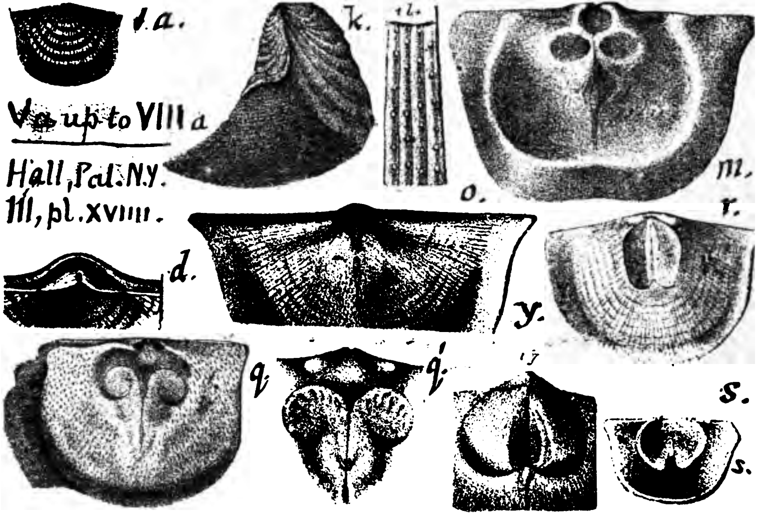
mena tenuistriata ; depressa ; rugosa ; Chonetes lineata) ranges from *Trenton, II c*, up to *Chemung*, *VIII g*. — See Wallenberg in Acta. Soc. Upsal, 1821. — Hall's Geol. N. Y. 1843, fig. 70, 3. —



This figure has been by mistake placed on page 127 of this Dictionary under the wrong name of Chonetes lineatus. — Vanuxem's Geol. N. Y. 1842, fig. 33, 3. — Logan's Geol. Canada, 1863, p. 311, fig. 314 (*Clinton*) ; and p. 367, fig. 373 (*Corniferous.*) — Pal. Ohio, Vol. I, 1873, page 75, plate 5, fig. 6 *a*, *e*. — Wilckens in Collett's Geol. Ind. 1888, page 288, pl. 22, f. 4 to 10, — In Pennsylvania, it first appears in the *Clinton upper shales*, over the fossil ore, in Mifflin and Huntingdon counties (T3, 141) ; and in Bedford Co. in the *shale partings* of the ore bed itself (T2, 144) ; as, at McKeysville, Specs. 501–1 ; 502–16 *c*, -24 ; 505–8, -12 ; and at Orbisonia, Specs. 504–1, -5, -9, -11 ; 508–1 (dorsal valve), -2 ; and in Blair Co. at Bell's Mills, Spec. 506–10, -20, -24. — Then it appears in the *Lower Helderberg*, from the *Bastard limestone* to the base of the Oriskany, in Columbia and Montour Cos. (G7, 92, 98, 101, 261) ; in Monroe and Pike Cos. both above and below the *Stormville conglomerate* (G6, 132, 134) ; in Hunt. Co. in the *bastard* of the Coffee run quarries (T3, 172) ; in Bedford Co. abundant in the *Cherty top layers* just under the *Oriskany* (T2, 134, 159, 187). — Then in the upper member of the *Oriskany*. the *Cauda-galli grit*, at Stroudsburg and elsewhere along the Delaware river outcrops (G6, 122). — Then in the *Corniferous* (White's *Marcellus limestone*) at Selinsgrove on the Susquehanna (G7, 79, 360, 361) ; and in acknowledged *Corniferous* at Stroudsburg, etc. (G6, 121). — Then in the *Chemung upper beds*, in Tioga Co. Spec. 853–4 ; and in McKean Co., in loose pieces of *Pocono* (?) *sandstone* in Wilcox Hill, Specs. 3283, 3288 — *V a ; VI ; VII b ; VIII a ; VIII g ; X?*

Strophomena rugosa, Rafinesque, 1781 (*Anomites rhomboidalis* Wash. 1821 ; *Producta depressa*, Sow. 1825 ; etc. ; *Lep-*

tæna rugosa, Dalman; *L. depressa*, Dal.; *Orthis rugosa*, Von Buch, 1837, etc., etc.; *S. depressa*, Vanux., 1842; *S. undulata*, Vanux.; *S. rhomboidalis*, Davidson. In a foot note Hall gives other old names: *Conchites rhomboidalis; Anomia inequi-*

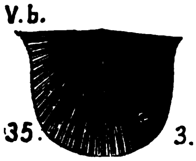


lateris.) Hall, Pal. N. Y. Vol. 3, 1859, page 195, plate 19, fig. 1 *a* to *i*, usual aspects; *k*, profile to show the extent of the bent part of the shell in extreme cases; *l*, *m*, dorsal interiors; *o*, *p*, *q*, dorsal casts; *q'*, *enlargement* of muscular scars; *r*, *s*, ventral interiors. Found in the *Pentamerus L.*, but chiefly in the *Delthyris shaly limestone* of the *Lower Helderberg*, east N. Y. — In Pennsylvania, Perry Co., Millerstown, Spec. 12,680, *Clinton fossil ore;* Spec. 11,838 (10), 12,710, 12,802 (3) in shales just under *Oriskany sandstone.* — Also in Montour and Northumberland Cos. (G7, 89, 244, 272, 298, 313, 344, 348); also, in Pike Co., Hogback, Spec. 608–3 (three); — also in Centre Co. (T4, 430). — In *Oriskany sandstone*, at Orbisonia, Hunt. Co., Spec. 702–3 (obscure). — In Perry Co. Claypole refers it also to the *Marcellus.* (F2, preface, p. xiii.) *V a*, *VI*, *VII*, *VIII b*.

Strophomena sericea. See **Leptæna sericea.** *II c.*

Strophomena setigera. See **Chonetes setigera,** *VIII b.*

Strophomena sinuata. See **Streptorhynchus sinuatus.**

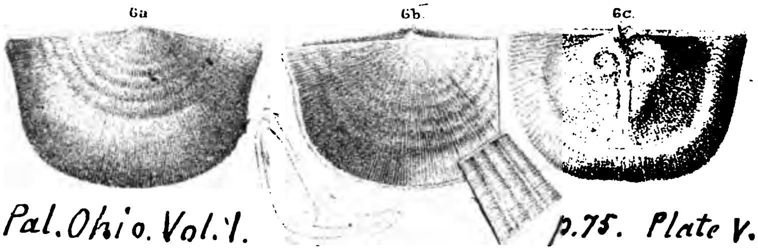


Strophomena striata. Hall, page 104, fig. 35, 3. *Niagara* formation. Afterwards named *Leptæna striata*, by Hall in Pal. N. Y. Vol. 2, 1851, page 259, plate 53, fig. 7. See *Leptæna sericea* in Vol. 2, above. *V b.*

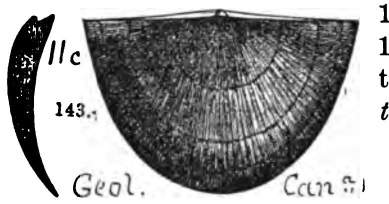
Strophomena subplana. See **Streptorhynchus subplanus.** *V b.*

Strophomena sulcata. See **Streptorhynchus sulcatus.**

Strophomena tenuistriata (*Leptæna rhomboidalis*, Sowerby, Mur. Sil. Sys. 1839.) Pal. Ohio, Vol. 1, 1873, page 75, plate 5, fig. 6 *a* to *e*.


6a
6b
6c
Pal. Ohio. Vol. 1. p.75. Plate V.

Strophomena thalia, Billings. Canad. Nat. and Geol. Vol. 6, 1860. — *Trenton*, Geol. Canada, 1863, page —, fig. 143 *a*, ventral aspect; *b*, section. *Trenton limestone formation. II c.*



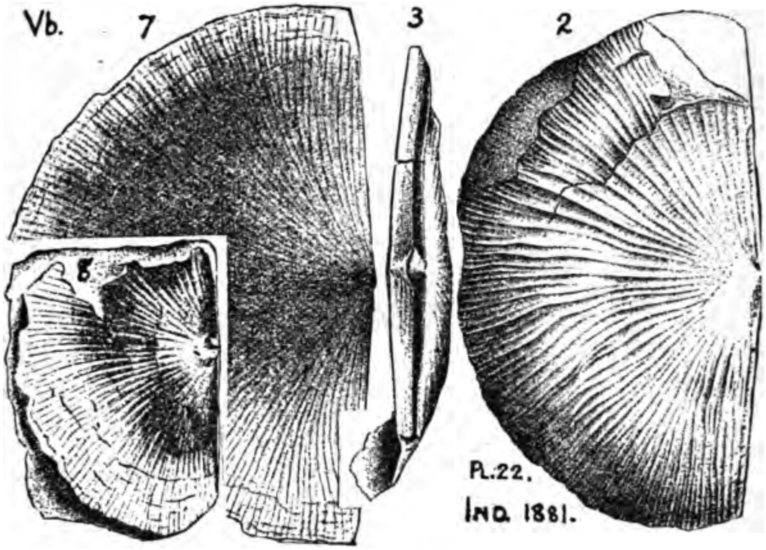
Strophomena trilobata. (*Leptæna trilobata*, Owen. Geol. Wisc., Iowa and Minn. 1852, plate 2, figs. 17, 18, in the shell beds on Turkey river, Iowa. Resembles somewhat *Leptæna deltoidea* of the N. Y. Trenton limestone, but is more distinctly lobate, etc. *II c.*

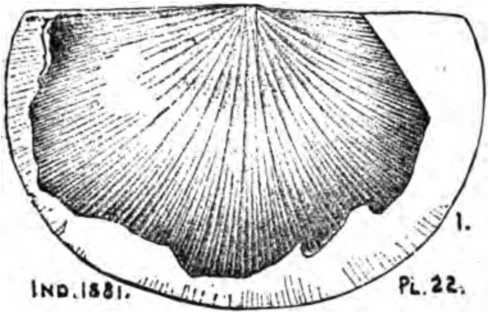
Strophomena transversalis. **Leptæna transversalis.** *Vb.*

Strophomena undulata. **Stroph. rhomboidalis.** *VIII a.*

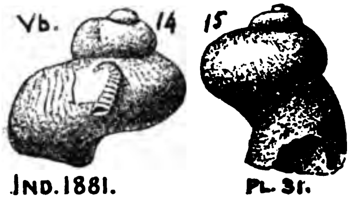
Strophomeana varistriata. Con. See **Strophodonta varistriata,** Hall. *VI.*

Strophonella semifasciata, Hall, in Collett's Indiana Report of 1881, page 292, plate 22, fig. 1, 2, 3, two dorsal valves and hinge; plate 23, fig. 7, ventral valve; 8, inside of imperfect dorsal. Waldron. *Niagara.* *Vb.*

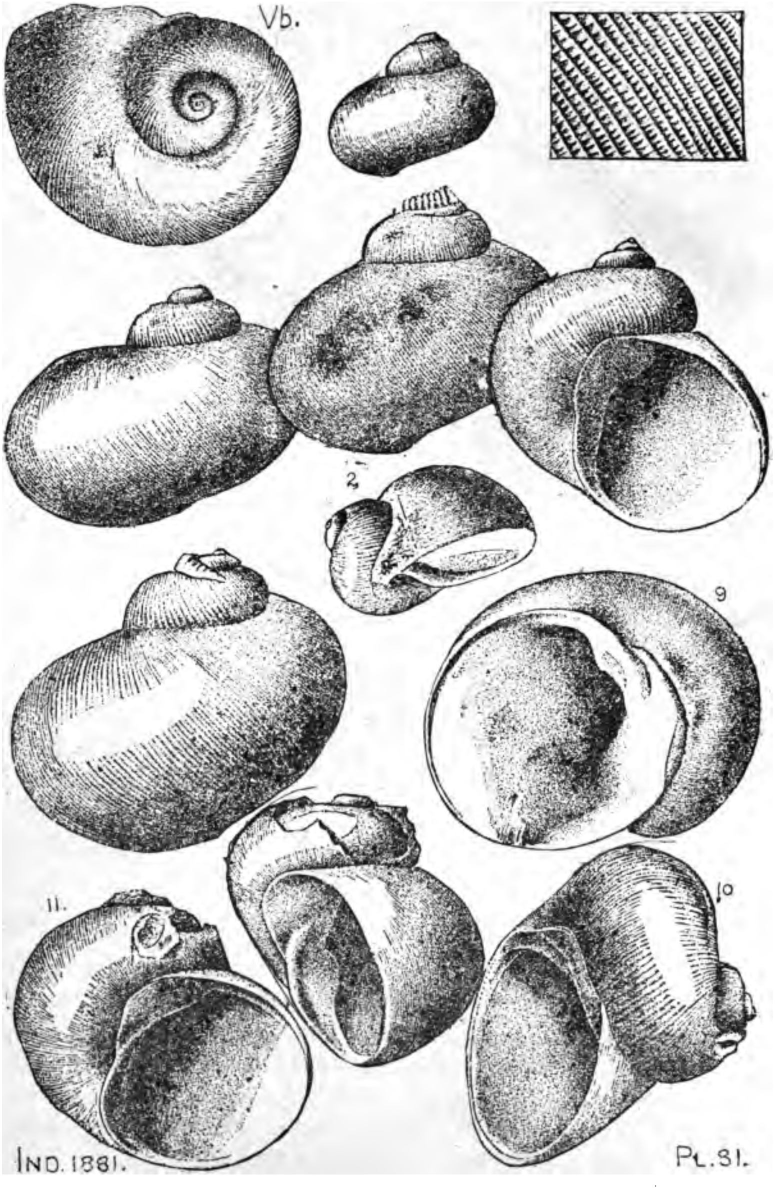



1.
IND.1881.
PL.22.

Strophostylus cyclostomus, *var.* **disjunctus,** Hall, in Collett's Indiana report of 1881, p. 320, plate 31, fig. 1, back of small specimen; 2, larger, characteristic specimen, showing obliquity of aperture; 3,4, usual size; 5, shows inner lip and columella; 6, back, very rotund whorls; 7, aperture of

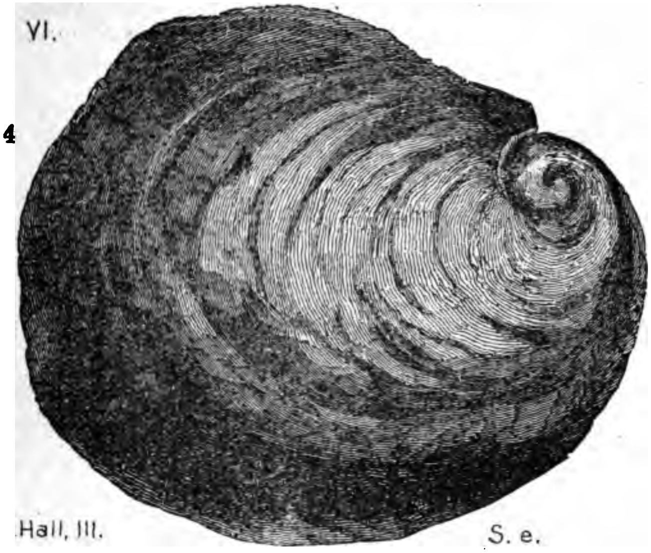


one more erect and elevated; 8, 9, 10, views of a large perfect specimen, striæ, etc.; 11, 12, to show mouth, inner lip, columella, etc.; 13, *enlarged* striæ of full grown shell, showing cross striæ of growth and finer revolving lines; 14, 15. *Niagara*, *Vb.*

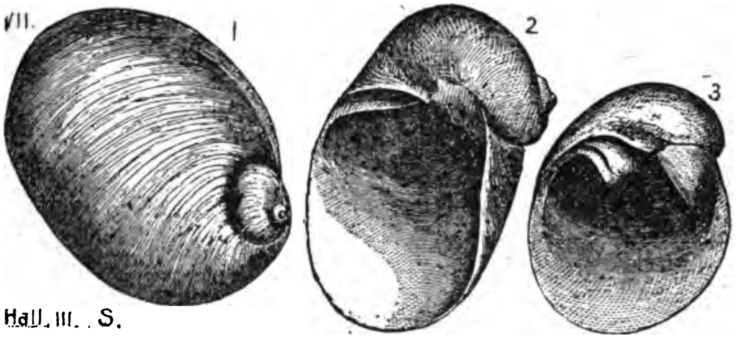


Strophostylus expansus. (*Platyceras expansus*; Conrad's original wood-cut in Annual Report, N. Y., 1841, page 56.) Hall, Pal. N. Y. Vol. 3, 1859, page 304 fig. 4, *Low. Helderberg limestone. VI.*

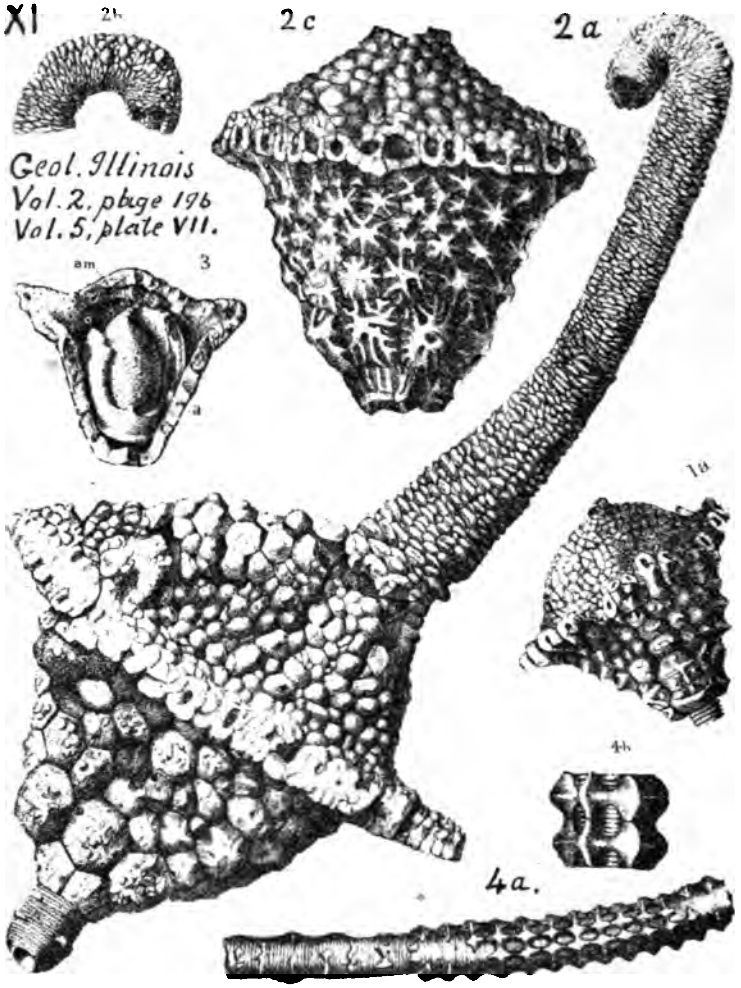
4



Strophostylus —— ? Hall. Palæontology of New York, Volume 3, 1859, page 303, figs. 1, 2, 3. — *Oriskany VII.*

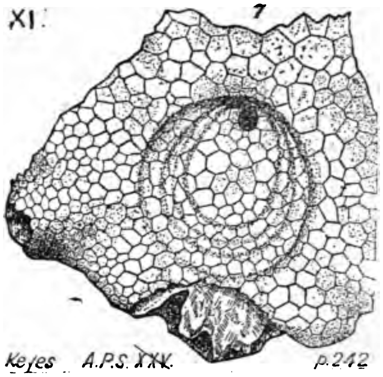


Strotocrinus liratus, (*Actinocrinus liratus*, Hall Supple. Iowa Rt. Vol. 1, part 2, 1860; *A. subumbrosus*, Hall, Ib. p. 3, 1860.) Meek and Worthen, Geol. Ill., Vol. 2, p. 196, 1866; Vol. 5, 1873, page 355, plate 7, fig. 2 *a*, side view of body and long ventral tube or proboscis, a little distorted by pressure, and weathered almost smooth; *b*, side view of end of proboscis, the layer plates on the curved side proving that it was not flexible; *c*, another specimen not weathered, and therefore



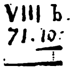
showing the sculpture. Found in the upper beds of the (Subcarboniferous) *Burlington limestone. XI.* — Fig. 3, shows folded intestines nearly filling the body of a broken specimen of some species of *Strotocrinus*, but covered with a siliceous crust. — Fig. 4 *a* and 4 *b*, *enlarged*, is part of a column or footstalk of a *S. ægilops.* — Fig. 1 *a*, shows side and back of a *S.* (*Physetocrinus*) *asper.*

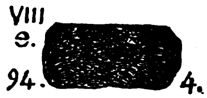
Strotocrinus (*Actinocrinus*) **regalis,** Hall. Supp. Geo. Report of Iowa, 1860. *Burlington group.* Keyes, Amer. Philosop. Soc. Vol. 25, No. 128, page 242, fig. 7, growing on a *Platyceras. Subcarboniferous limestone. XI.*



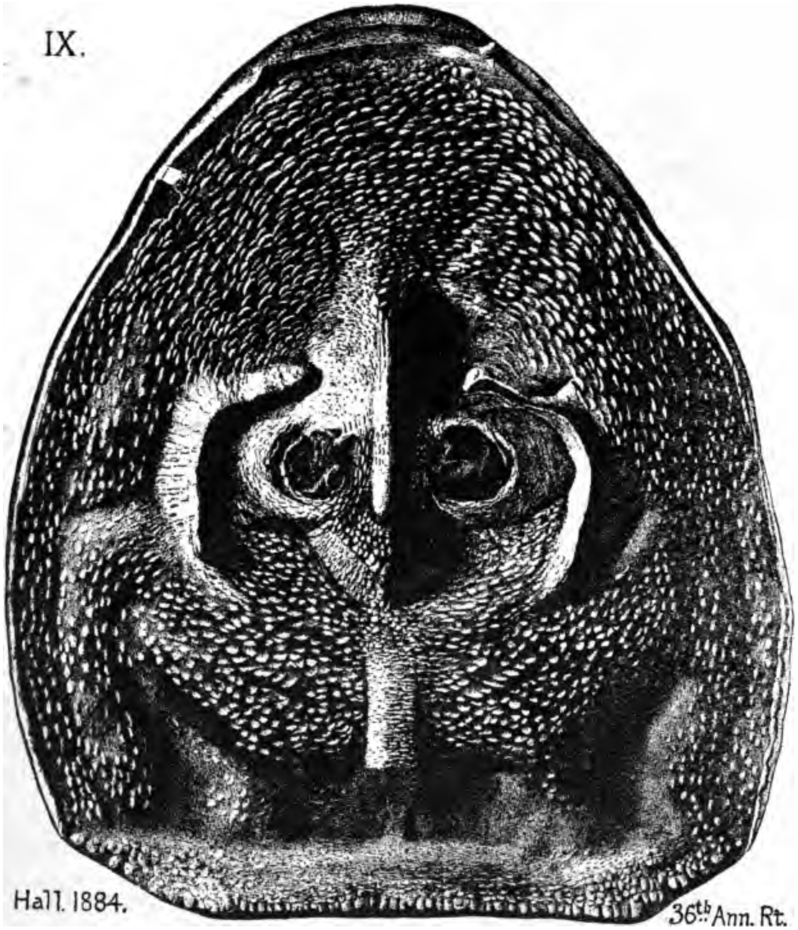
Stylifera primigenia. See **Macrocheilus primigenius.** *XIII.*

Styliola fissurella (*Tentaculites fissurella.* Hall, Geol. N. Y. 1843, page 180, fig. 71, 10. *Marcellus;* page 222, fig. 94, 4. *Genesee.*) — In Huntingdon Co., Pa., vast numbers of them in a fine exposure of *Marcellus black shale* made by the deep railroad cut near Brumbaugh's crossing (T3, 190), south of Grafton (T3, 114; Spec. 12,730). — Also, in Northumberland Co., near Selinsgrove (G7, 79, 360: Spec. 12,253). — In Perry Co., at Barnett's mill, Spec. 11,736 (one of the five), 11,737; and in Huntingdon Co., at McConnellstown (T3, 108), in the top beds of the *Genesee. VIII b; VIII e.*



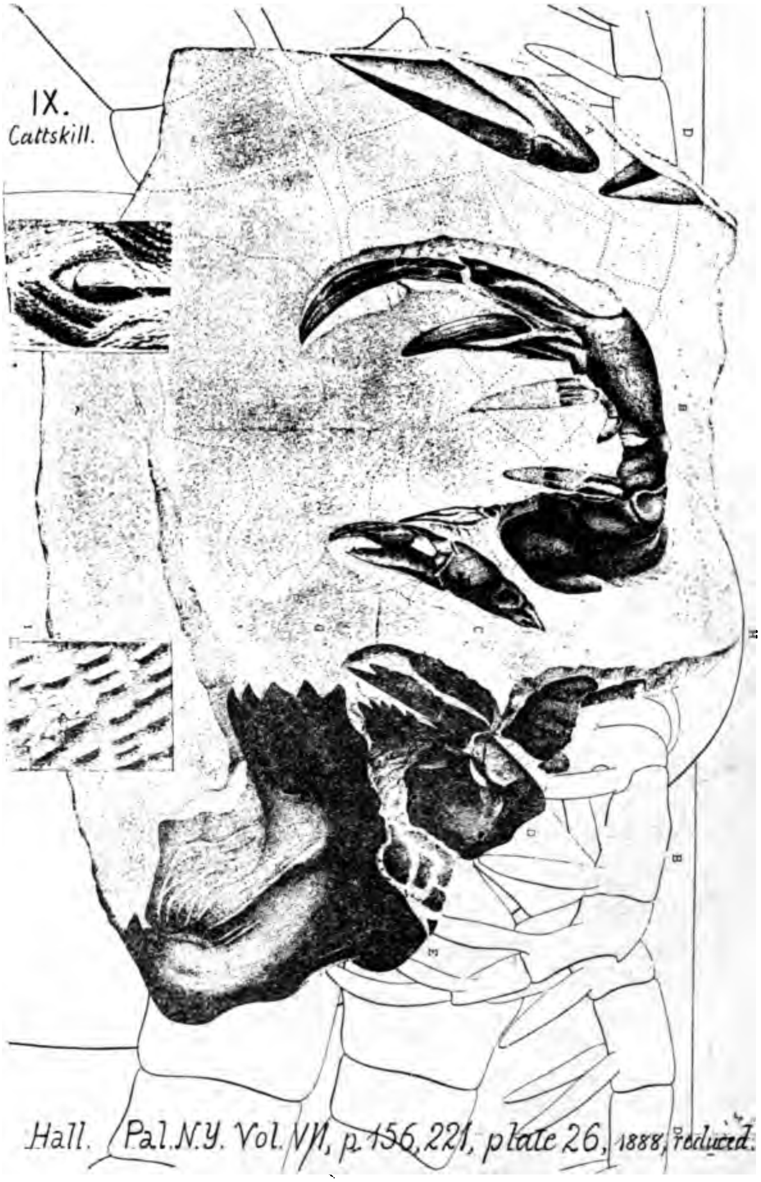


Stylonurus excelsior, Hall. 36th Annual Report, N. Y. 1884, page 77, pl. 5, fig 1 repeated in Pal. N. Y. Vol. VII, 1888, page 158, plate 26, plaster cast from a natural mould of the back surface of the head of this Eurypterid (which must have been in all about four feet long), found at Andes, Delaware Co., N. Y., in the middle of the Catskill formation. (Original in the Museum of Rutger's Coll., New Brunswick, N. J. Another specimen in N. Y. State Mus. of N. H., New York, was noticed in Trans. N. Y. Ac. Sc., Vol. 2, p. 8, Oct., 1882.) Figure on page 1140. Hall. Pal. N. Y. Vol. 7, p. 156, 221, plate 26, *reduced* by photography to *one half linear size.* Fig. 1, lower surface of type specimen of *Dolichocephala lacoana,* Claypole, restored from Woodward's drawing of *Stylonurus* in Palæont. Soc. 1872; A, fragment of appendage from guttapercha cast; B, right member of second pair of gnathopods; C, end joint, etc.; D, basal joint, etc.; E, part of basal joint, etc.; F, left basal joint of fifth pair, etc.; G, position of the mouth; H, outline


IX.
Hall. 1884.
36th Ann. Rt.

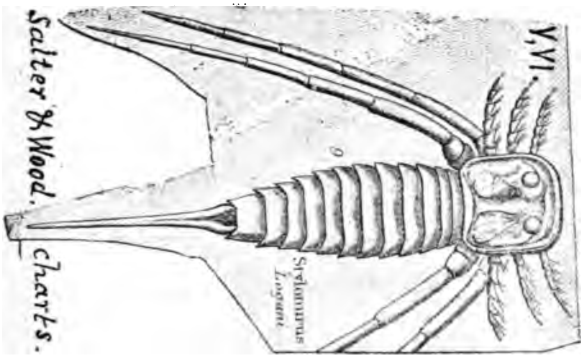
of carapace as it lies on the other side of the slab; Fig. 2, end of middle back ridge, etc.; Fig. 3, portion of carapace to show tubercles, etc. *See Hall's description.*— Found at Meshoppen, Wyoming Co., Pa., in *Catskill strata. IX.*

Stylonurus excelsior. Hall's figures. *See p. 1139.*



Hall. Pal. N.Y. Vol. VII, p. 156, 221, plate 26, 1888, reduced.

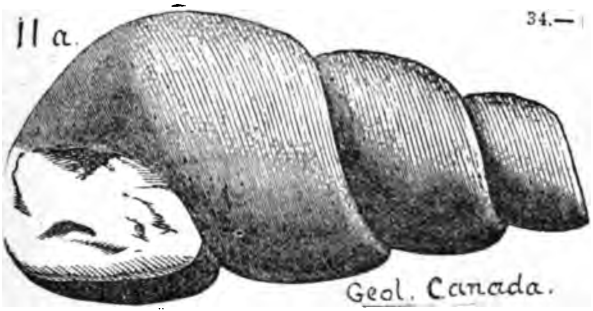
Stylonurus logani, from Davidson's chart of British Palœozoic fossils, Eurypterids, fig. 9; quoted by Hall as the basis of his calculation of the size of his Catskill **Stylonurus excelsior.**


Salter & Wood. Charts.
V.VI.
Stylonurus Logani

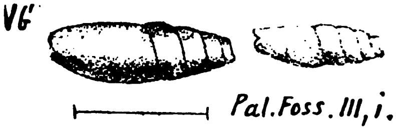
Subulites abbreviatus, Hall, 3d Rt. 1850. *II c.*

Subulites brevis, Winch. & Marcy, 1865. *V b*

Subulites calciferus, Billings, Canad. Nat Vol. 4, 1859. *Calciferous.* Geology of Canada, 1863, page 120, fig. 34 *Calciferous sandstone formation. II a.*

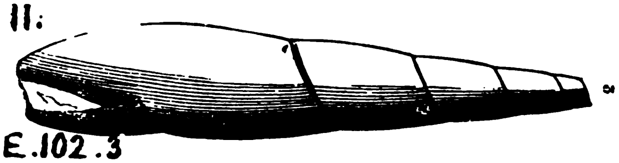

II a.
34.—
Geol. Canada.

Subulites compactus. Whiteaves. Pal. Foss. Canada, III, i, 1884, page 16, plate 3, fig. 2, somewhat enlarged; plate 7, fig. 6, about *twice nat. size,* from Durham, Canada West; much smaller than *S. ventricosa,* Hall, which is common in the same *Guelph formation* (*upper Niagara*) at Gault, etc., or than *S. terebræformis,* H. & W., from the same in Ohio. *Vb'.*



S. daphne, Billings. Pal. Foss. I, 1865. *Quebec.*

Subulites elongatus, Emmons, page 392, fig. 101, 3. II, c, *Trenton formation.* Given also in his American Geology, Vol. 1, part 2, page 155, but not under this name. *Trenton.* — Also



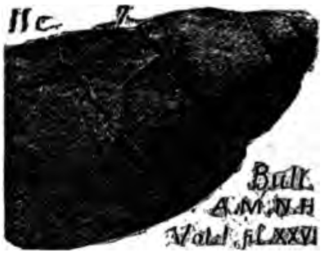
Geol. Canada, 1863, page 183, fig. 179. *Trenton limestone*, *II c.*

S. gracilis, S. A. Miller, J. Cin. S. N. H. Vol. 5, 1882. *V b.*

S. inflatus, Meek & W. Proc. A. N. S. Phil. 1870. *II c.*

S. notatus, Bill. Cat. Sil. Foss. Anticosti. 1866.

Subulites obesus, Whitfield, Bull. Amer. Mus. Nat. Hist. N. Y. Vol. 1, No. 8, 1886, page 318, plate 26, fig. 7, front part imperfect; has the general form of *S. psyche*, Billings (Pal. Foss. Vol. 1, f. 169), but larger and fatter; may, however, only be another form of *Holopea.* Fort Cassin, on the east shore of Lake Champlain, in "*Birdseye limestone*" beds now known to be *upper beds* of *Division D* of *Calciferous formation* (Brainard & Seely, Bull. Geol. Soc. Amer. Vol. 1, 1890, p. 505). *II a.*



S. parvulus, Bill. 1862. *Black River. II c.*

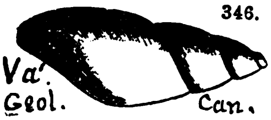
S. psyche, Bill. 1865. *Quebec group.*

S. richerdsoni, Bill. 1857. *Hud. Riv. III b.*

Subulites terebriformis, Hall & Whitfield, Pal. Ohio, Vol. 2, 1875, page 141, plate 8, fig. 6, a specimen imperfect at both ends, and restored at the lower end in the drawing, as indicated by the line of fracture. This is first species noticed in American *Upper Silurian rocks* which has not the spire bent to one side, like the *Salina S. ventricosa.* (Hall remarks, also, that it is embarrassingly like the *Lower Silurian* (*Trenton*) *S. elongatus*, Conrad, but is proportionally shorter in the spire, and not so regularly tapering, the whole being rounded towards the apex. Clifton, Greene Co., O. *Guelph* (*Upper Niagara*) *formation. V b'.*

Subulites ventricosus (Hall)

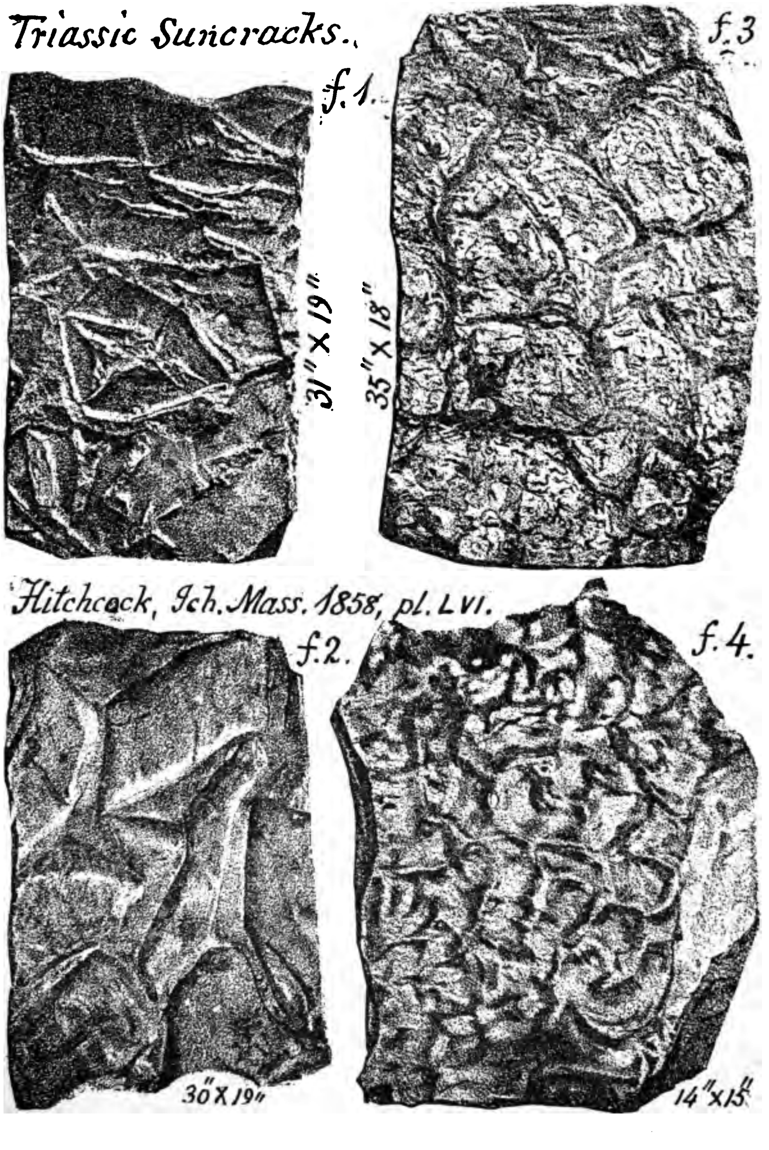
346.



Subulites ventricosus, Hall. Pal. N. Y. Vol. 2, 1852. *Niagara* and *Guelph.* — Geology of Canada, 1863, fig. 346. *Guelph formation. Va'.*

Sun-cracks of various forms fossilized in the Connecticut

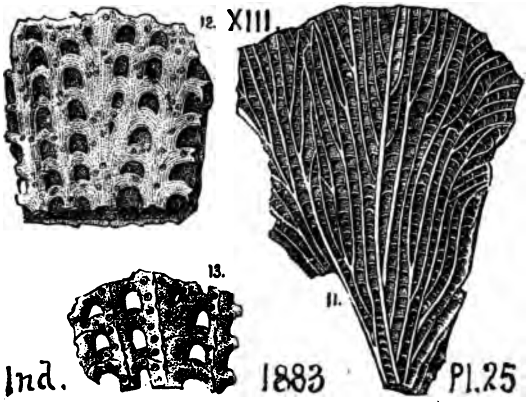
Triassic Suncracks.

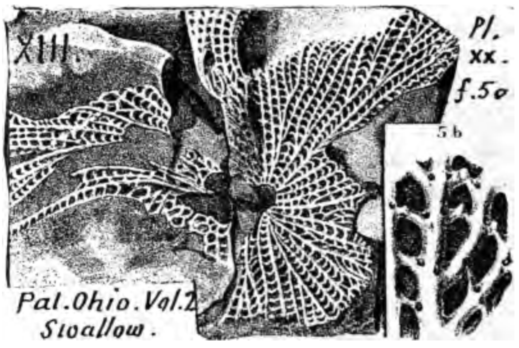


Hitchcock, Ich. Mass. 1858, pl. LVI.

river red sandstone beds. Hitchcock. Ich. Mass. 1858, page 169, plate 56, figs. 1, 2, 3, 4. (Compare also. plate 39, fig. 1.) Ambrotype reductions of slabs in the Amherst College museum covered with cracks made by the sun's heat in the surface of sand flats, filled with mud by the returning tide, their edges worn off, and the whole ridged by violent rains. The finest specimens have been found at the Portland quarries, "where sometimes the surface looks like mosaic, or rather like a pavement of polygonal masses, with mortar between the species." (See figs. 1, 2; fig. 3 is from Turner's falls). Hitchcock adds that the cracks were always made after the animals had left their tracks on the mud. *Trias.*

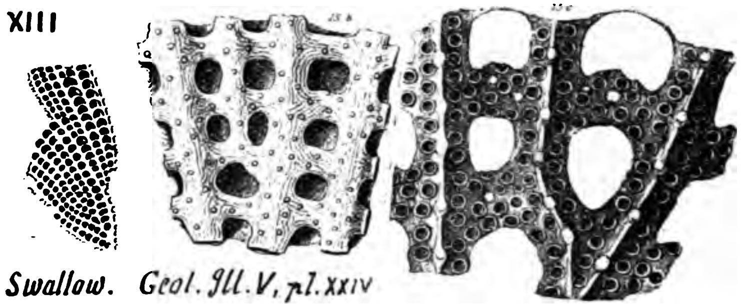
Synocladia biserialis. (Swallow. Transactions of the St. Louis Academy of Science, Vol. 1, 1858, page 179.) Collett's Indiana Report of 1883, page 138, plate 25, fig. 11, *natural size*, fragment of a frond, obverse side; fig. 12, piece of the same *enlarged;* fig. 13, small piece, still more magnified to show the pores in the porous side of the polyzoon. —Pal. Ohio, Vol. 2, 1875, page 326, plate 20, fig. 5*a*, the nonporiferous side; *b*, *magnified* ditto, to show cells. This is one of the commonest *Fenestelloids* of the *Coal Measures.* Roof shales of Indiana coal K, and thence upward through the *Upper Coal Measures.*





—In W. Pennsylvania. in the *Ferriferous limestone* (Q, 62; Q2, 47, 106; Q3, 25;) also in *Mercer lower limestone.* (Q2, 57, 58.)—*XII*, *XIII*, *XV.*

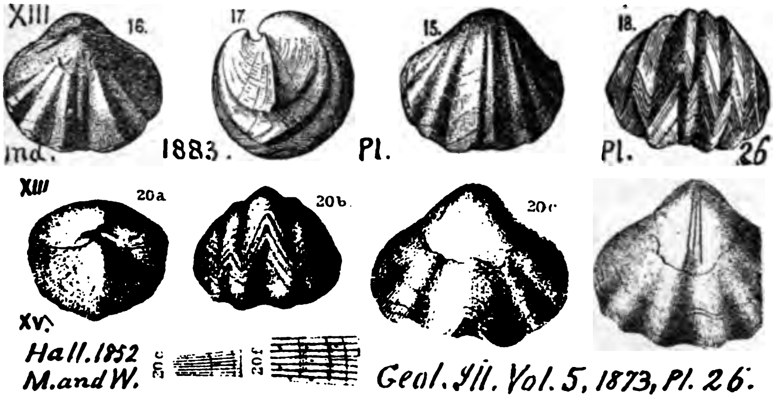
Synocladia virgulacea, *var.* **biserialis,** Swallow, Trans-


XIII

Swallow. Geol. Ill. V, pl. XXIV

St. Louis Acad. Sci., 1858.—M. & W. Geo. Sur. Ill., Vol. 5, 1873, plate 24, fig. 15*a*, *nat. size*, *non-poriferous* side of a fragment; *b*, *enlarged*, fine *striæ* and scattering pits; *c*, *highly magnified* poriferous side, cells, keels, and spine-like tubercles; dwarfed cells are seen also on specimens from the *Chester limestone.*—Found in the Illinois *coal measures.* *XIII.*

Syntrielasma hemiplicatum. (*Spirifer hemiplicatus*,



XIII

Ind. 1883. Pl. Pl. 26

XIII

XV?

Hall. 1852

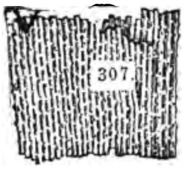
M. and W.

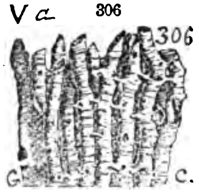
Geol. Ill. Vol. 5, 1873, Pl. 26.

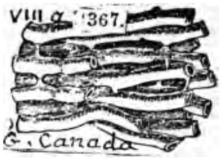
Hall, in Stansbury's Salt Lake Report of 1852, plate 4, fig. 3.) Meek & Worthen, Geol. Illinois, Vol. V, 1873, page 571, pl. 26, fig. 26*a*, *b*, *c*, *d*, *e*, *f*. Found at various places in Ill. in *Lower* and *Upper coal measures.* Collett's Indiana Rt., 1882, page 131, plate 26, figs. 16 to 18, *natural size*, full grown specimen. —*Coal measures*, *XIII*; *XV.*

Syringodendron cyclostigma, Brongnt. Hist. Veg. Foss. pl. 166, fig. 2, 3, Lesq. Geol. Pa., 1858, p. 878. (*Sigillaria cyclostigma*, Geinitz) Lesq. Coal Flora, 1880, page 505, plate 70, figs. 4, 4*a*. Common in Anthracite fields, especially at Treverton; not rare at Pittston. Included in White's list of Lesquereux's plants under *Darlington coal*, Beaver Co. (Q, 55.) — In Venango Co. found by Carll, *over Second Mtn. Sand*, in yellow sandstone, 2½ m. south of Oil City. Spec. 3100; see also *loose* Spec. 2792, from Ennis hill, near Pleasantville; both in *Upper Pocono? X? — XIII.*

Syringopora compacta, Billings. Canadian Naturalist, Vol. 3, 1858. *Upper Silurian.* Geology of Canada, 1863, page 306, fig. 307. *Anticosti group* (*Clinton.*) *Va.*



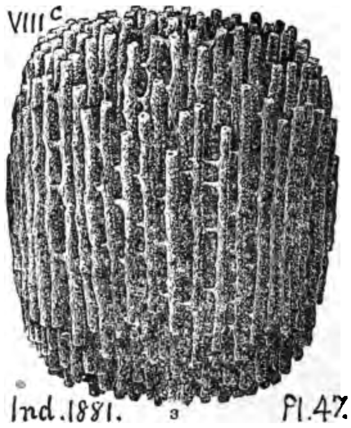


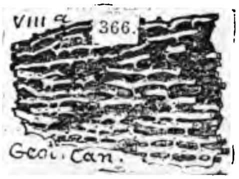


Syringopora dalmani, Billings. *See fig. 306 above.*

Syringopora hisingeri, Billings. *See fig. 367 above.* Canadian Naturalist, 1858. *Corniferous.* Geology of Canada, 1863, page 366, fig. 367. *Corniferous limestone. VIII a.*

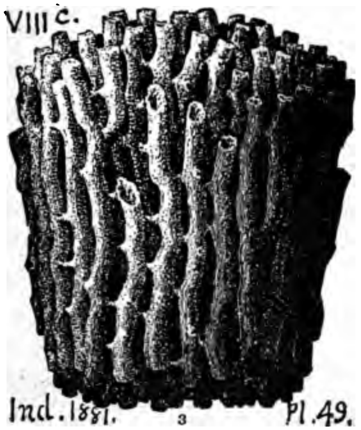
Syringopora macluria, Billings, Canadian Jour. Vol. 5, 1860, Collett's Indiana Report of 1881, page 399, plate 47, fig. 3, mass of coral; fig. 4, one of the corallites, showing funnel-shaped partitions (septa.)—Abundant in *Corniferous limestone* of Canada West, a specimen from

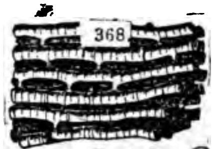

VIII c
Ind. 1881.
3
Pl. 47.



which is figured in Geol. Canada, 1863, page 366, fig. 366. — *VIII a.*

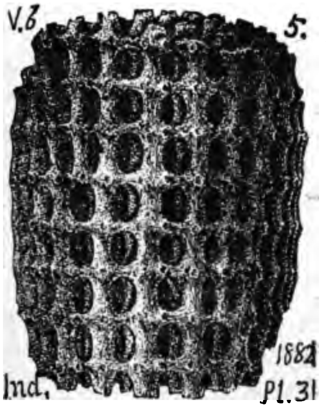
Syringopora perelegans. Billings (Canad. Jour. Vol. 4.) Collett's Indiana Report of 1881, page 398, plate 49, fig. 3.—(NOTE. Very near to *Syringopora reticulata*, Goldfuss, in the *Carboniferous* of Europe. — In Logan's Geol. of Canada, 1863, page 366, figure 368 represents a specimen from the *Corniferous limestone formation* in West Canada. *VIII a.*

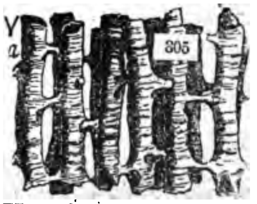

VIII c.
Ind. 1881.
3
Pl. 49.



Syringopora retiformis, Billings. Canadian Naturalist and Geologist. Vol. 3, 1858. *Upper Silurian.* — Geology of Canada, page 306, fig. 304, from the *Anticosti group* (*Clinton?*). *V a?*

Syringopora verticellata? Goldfuss. (Petrefact. Germ. 1826). Collett's Indiana Report of 1882, page 254, plate 3, fig. 5, (by Van Cleve); but it does not correspond with Goldfuss' figure; nor with specimens identified as *verticillata*, from the Niagara formation of the Western States. (Collett.) Specimens may be found at all the Niagara outcrops in Indiana; has





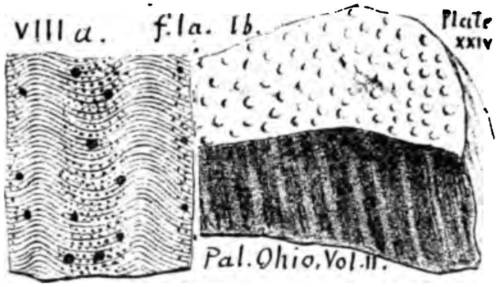
been found at Drummond's Island, Lake Huron; and in the Drift gravel at Dayton, O. — In Geol. Canada, 1863, page 306, figure 305 is a Canadian specimen. *Niagara. V b.*

Syringopora —— ? Hall, Geology of Fourth District, N. Y., 1843, page 160, fig. 63, 3 (Silicified in relief) is a specimen from the *Onondaga limestone* of Western New York. *VIII a.*

Syringopora —— ? in grey cherty beds, 100′ below the *Oriskany*, Bedford section (T2, 149.) *VI.*

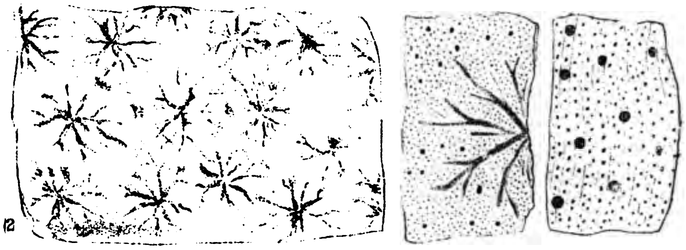
Syringopora, *several species*, in the outcrops of the *Tully limestone*, Monroe and Pike Cos. at the heads of Sawkill, Raameskill, and Dingman falls (G6, 109). *VIII d.*

Syringopora —— ? replaced by spar, in the lower division of the *Waynesburg limestone* on Brown's run, German township, Fayette Co., Pa., giving the rock a birdseye appearance. (K2, 243.) *XV.*

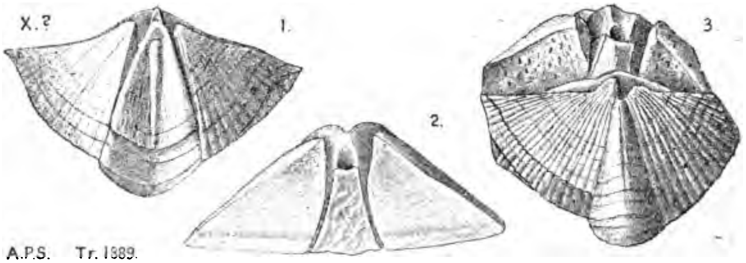

VIII a.
fig. 1b.
Plate XXIV
Pal. Ohio, Vol. II.

Syringostroma columnare, Nicholson. Pal. Ohio, Vol. 2, 1875, page 253, plate 24, fig. 1*a*, *natural size*, a fragment; *b*, *greatly enlarged* vertical section; surface covered with many low rounded elevations, their centres the ends of columns, around which (in well preserved specimens) a row of minute round mouths of vertical canals; character entirely unique. Sandusky, O. *Corniferous limestone. VIII a.*

Syringostroma densum, Nicholson. Pal. Ohio, Vol. 2, 1875, page 251, plate 24, fig. 2, *natural size*, fragment; 2*a*, *enlarged* surface; 2*b*, *enlarged* vertical section; a singular species; flattened wavy crusts ½ to 1 inch thick, perhaps outside pieces of mosses; clearly distinct from *Stromatopora constellata*, Hall, from *Coralline limestone.* (Pal. N. Y. Vol. 2, p. 324, pl. 72, fig. 2.) Kelley's Island, etc., O. *Corniferous. VIII a.*

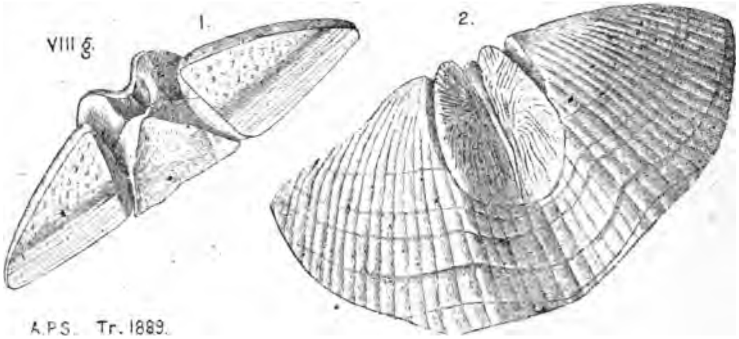


Syringothyris angulatus, *new species*, Simpson. Trans. Amer. Phil. Soc. Phila., 1889, page 440 fig. 1, and 2. Fig. 3, shows the area. Species based on Randall's specimens 9480, 9538,9535,(wrongly labelled *Spirifera*) collected at Warren,Pa., — This species closely resembles *S. randalli;* but the specimens are usually of smaller size; the mesial sinus and fold proportionately narrower; the cardinal extremities angular and frequently attenuate. — *Pocono* (*Waverly*) *formation. X.*

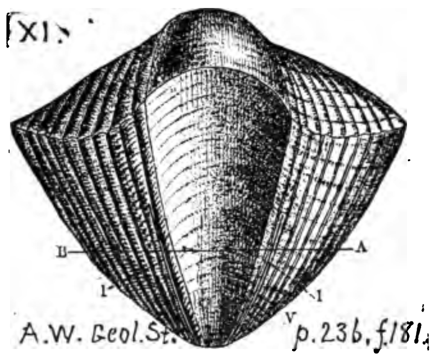


Syringothyris randalli, *new species*, Simpson. Trans. Amer. Phil. Soc. Philada., 1889, page 441, fig. 1, area; fig. 2, ventral valve; based on Randall's specimens 9480, 9532, 9533, 9534, wrongly labelled *Spirifera*, got at Warren, Pa. — Shell transversely semi-elliptical or semi-circular; ventricose, becoming gibbous with age; length usually about one-

half the width, but sometimes three fourths; hinge line straight, length equal to the greatest width of the shell. Cardinal angles more or less rounded, not attenuate. Ventral



valve with a high vertical or slightly sloping cardinal area, from the apex of which the sides of the shell curve outward to the antero-basal margins. A median sinus begins at the beak, rapidly widening as it extends forward, and becoming deep, with abruptly sloping sides; where it reaches the margin the shell is produced in a conspicuous linguiform extension. The deltidial aperture is covered for about one-half its length from the beak, by an arched transverse callosity or pseudo-deltidium. The edges of this callosity unite with the strong dental lamellæ which divide the rostral portion of the shell into three chambers; and from the inner posterior surface of the callosity extends the syringo-thyral tube, which is unusually broad near its posterior extremity, but tapers rapidly to an open termination, sloping into the internal cavity. This tube is split for its entire length along its outer surface, and appears to have been thickened and filled in its posterior portion with the increasing age of the animal. Dorsal valve convex; greatest convexity at about one-third the length of the shell from the beak; convex to the cardinal line, becoming somewhat flattened at the cardinal extremities; gradually curving to the lateral and basal margins. Mesial fold narrow at the beak, rapidly widening and becoming prominent below; produced at the margin, corresponding to the linguiform extension of the ventral valve. Surface of the valve ornamented by from forty to sixty costæ, which occur both on the sides and the sinus. Radiating striæ crossed by concentric striæ, which, in the specimens observed, are most conspicuous on the mesial fold and sinus. There are also lines of growth, which are usually the strongest on the anterior portion of the shell. Horizontal lines of growth, without vertical cross lines, are conspicuously developed on the cardinal area. On the ventral valve the muscular scars are strongly developed, and extend over nearly two-thirds the length of the shell; ovate in outline, the width being equal to three-fourths of the length; the area being largely occupied by the cardinals, between which lie the narrow linear adductors. The casts of the dorsal valve show the marks of the deeply striated cardinal process and elongate tooth-sockets. In casts of the ventral valve the whole upper portion and the area are marked by numerous irregularly disposed prominent pustules. From the external characters alone it would be impossible to separate this species from *Spirifera disjuncta*, but the internal differences are generic. — *Chemung* near Warren, and at Union City, Erie County. *VIII g.*

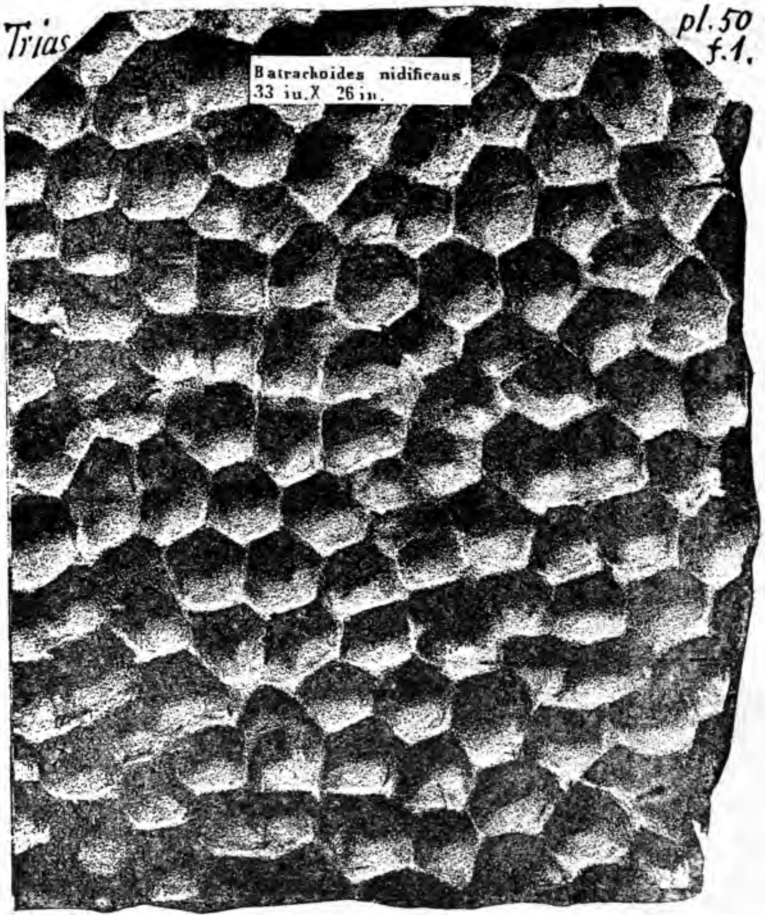


Syringothyris typus (or **typa**,) Winchell, (Proc. Acad. Nat. Sc. Phila., 1863; and in Geological Studies, 1886, page 236. fig. 181. — *L. Carboniferous* (*Kinderhook* and *Keokuk limestones*) in the west; and in massive fossiliferous "Corry sandstone" on the Erie Warren county line, fine specimens in Hatch's collections (Q4, 93, foot-note.) In Ohio, is characteristic of the *Bedford bottom shale*, *Catskill.* (See White's inference in Q3, 63, foot note.) — In Warren Co. found by Randall, at Warren. (I, p. 73.) — *IX; X.*

Tadpole nests. (*Batracoides nidificans*, Hitch.) Ich. Mass, 1858, page 121 and 184, plate 21, fig. 5, 7 (omitted); plate 50, fig. 1, 2, 3 (and 4 omitted.) See Dr. Hitchcock's instructive and picturesque description of the "Tadpole City" at Amherst, Mass., and the deductions from it to an understanding of the nature of the specimens in the College Museum. Fig. 5, *re-*

Trias

pl. 50
f. 1.



Hitchcock. Ich. Mass. 1858, plate 50

f. 2.

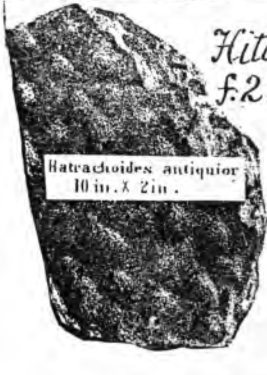
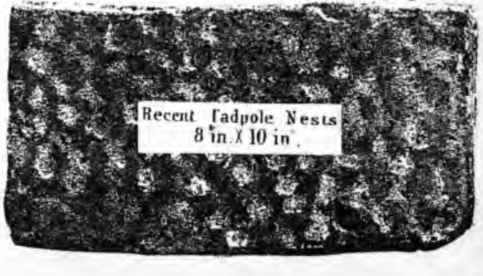


fig. 3.



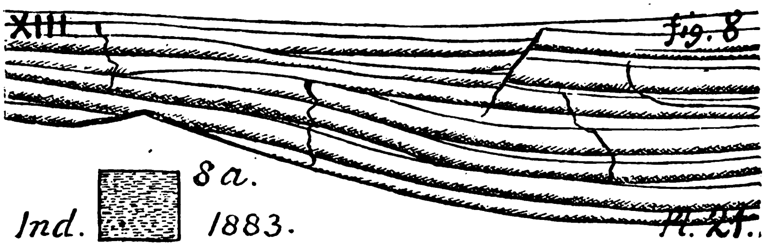
duced in size, shows nests an inch in diameter and $\frac{1}{10}$ in. deep. South Hadley. *Trias.*

Nests of another species (*Batracoides antiquior*,) an inch in diameter, but deep, are shown in plate 50, fig. 2, *much reduced*, on a slab in the Amherst museum, from the *Niagara limestone* at Lockport, N. Y. Prof. Hall undeceived Dr. Hitchcock about these, by informing him that the depressions were in the *under* and not in the *upper* surface of the slab.

Tæniophyllum brevifolium, Lesq. Coal Flora, page 788. *XIII.*

T. contextum, Lesqx. Proc. A. P. S., 1878.

Tæniophyllum decurrens. (Lesq., Proc. Amer. Phil. Soc. Phila., 1878, page 330; Coal Flora of Pa., 1880, page 461; resembles leaves of *Cordaites;* but Mansfield's fine specimen from Kitt. coal bed at Cannelton, Beaver Co., Pa., shows the difference, and connects them with a stem of *Stemmatopteris schimperi*, but possibly only as parasitic; page 788, *Tæn. brevifolium*, connects them still closer with the *Lycopodeaceæ.*) Collett's Indiana Rt, 1883, page 101, plate 21, fig. 8. — *Kittanning coal. XIII.*

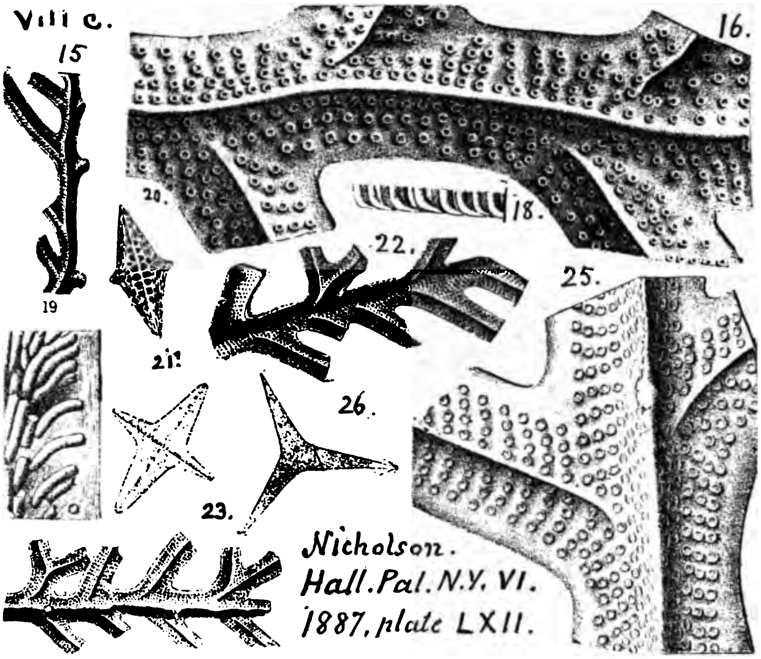


T. deflexum, Lesqx., Proc. A. P. S., 1878.

Tæniophyllum stigmarioides, Lesqx. Sp. inedit. Specimen No. 770 of Lacoe's Cabinet at Pittston, P. From the *Kittanning coal* at Cannelton, Beaver Co., Pa. *XIII.*

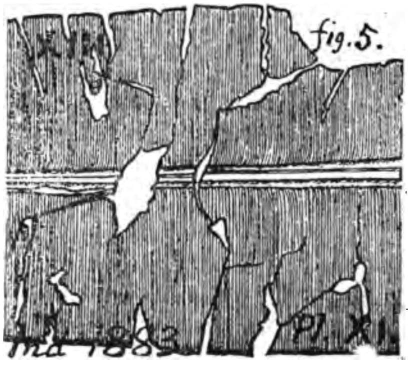
Tæniopora exigua, Nicholson. (*Pteropoda auogenesis*, Hall.) Geol. Mag. Lond. Vol. 1, 1874. Improved description and figures in Hall's Pal. N. Y., Vol. 6, page 263, plate 62, fig. 15 to 25. — In Monroe Co., Pa., Marshall's falls, Spec. 501–10; also on the lower part of Spec. 807–28 — In Columbia Co., in the rich layer 100′ beneath the top of *Hamilton.* (G7, 229.)

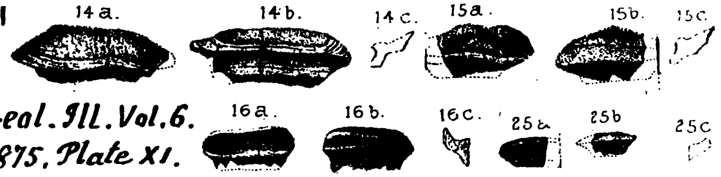
(*Tæniopora exigua* continued from page 1154.)



— In Perry Co., Barnett's mill, spec. 11,717 (four) *Hamilton upper shale. VIII c.*

Tæniopteris smithii. (Lesquereux, Geol. Report of Alabama, 1875. Coal Flora of Pa., 1880, page 153, plate 25, fig. 7, a fine and remarkable species of Lowest Carboniferous Alabama plants, somewhat like *Tæniopteris multinervis*, Weiss., *Tæn. carbonaria*, Schimper.) — Collett's Indiana Rt. 1882, page 56, plate 11, fig. 5 is a copy of Lesquereux's figure. — *Subconglomerate coal measures* of Alabama; one or two from Wilkes-Barre anthracite beds. Lesq. *X? XIII.*

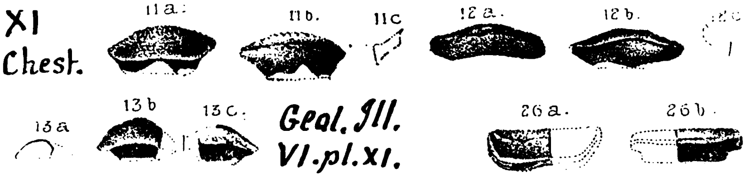




XI

Geol. Ill. Vol. 6.
1875. Plate XI.

Tanaodus bellicinctus. St. John & Worthen, Geo. Sur. Ill., Vol. 6, 1875, page 376, plate 11, figs. 14*a*, *b*, *c*, large perfect tooth; 15*a*, concave face of a worn tooth, *b*, convex face, *c*, profile; 16 *a*, *b*, concave and convex faces of a small worn or immature tooth; 25 *a*, *b*, *c*, another similar tooth. All from Chester, Ill., the *lower fish bed* of the *Chester* (*Subcarb.*) *limestone. XI.* — NOTE. It is not difficult to distinguish three or four forms, with more or less individual variability, in the collection of fish teeth from this rock and locality; but their specific values are doubtful. (The same is true regarding the fish teeth found in the *St. Louis division* of the *Subcarboniferous limestone formation.*) This species is based on only one perfect tooth, intimately allied to the laterally elongated teeth of *T. obscurus*, Leidy, differing in a marked manner from *Antliodus* (a *Petalodus* with very flat bottom and short root).



XI
Chest.

Geol. Ill.
VI. pl. XI.

Tanaodus depressus, St. John & Worthen, Geo. Sur. Ill., Vol. 6, 1875, page 371, plate 11, figs. 11 *a*, *b*, *c*, median size tooth, with denticulate crest; 12 *a*, *b*, *c*, obtuse crested tooth; 13*a*, outline of small tooth, *b*, concave face *enlarged twice*, *c*, convex face, *d* profile. Chester, Ill., from the *lower fish bed*, *Chester limestone. XI.* — NOTE. General likeness of outline to some forms of *Polyrhizodus*.

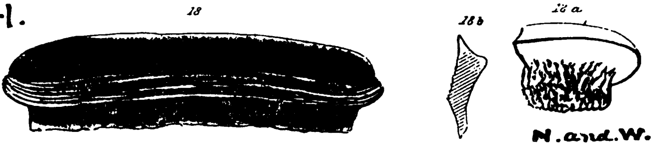
Tanaodus grossiplicatus. St. John & Worthen, Geo. Sur., Ill., Vol. 6, 1875, page 375, plate 11, figs. 26 *a*, *b*, *c*, concave face, convex face, and profile of a unique broken fish tooth in unusually perfect preservation, most nearly resembling *T. angulatus*, N. and W. (from the Coal measures) but smaller.

Differs little from the *Keokuk* and *Up. Burl. lime.* fish teeth, except in its straight concave border, even crest, and stronger proportions. Probably found in the *Chester lower fish bed. XI.* — *For figure see under T. depressus.*

Tanaodus (Chomatodus) multiplicatus, Newberry & Worthen, Geo. Sur., Ill., Vol. 2, 1866, page 57, plate 3, figs. 18*a*, front face, *b*, section, of a unique fish tooth from the *Burlington* (*Subcarb.*) *limestone. XI* — Note. This specimen is very unusually broad, separating it widely from *Petalodus*, otherwise like it. Newberry remarks (p. 57, 58,) " It is but fair to suppose that between the fishes bearing the narrow, the broad, the sagittate, the oval, the linear, and the quadrate teeth included in the *Petalodont* family, there were at least as great differences as between *Myliobatis*, *Ætobatis*, *Zygobatis*, and *Rhinoptera*.

XI. Burl.

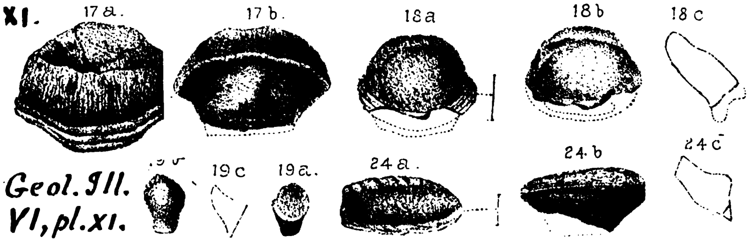
Geol. Ill. VI. pl. 3.



N. and W.

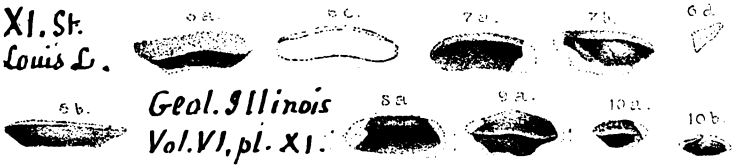
Tanaodus polymorphus, St. John & Worthen, Geo. Sur. Ill., Vol. 6, 1875, page 380, plate 11, figs. 17 *a*, X2, concave face of large fish tooth, *b*, convex face, *c*, profile; 18 *a*, *b*, *c*, X2, less symmetrical tooth; 19 *a*, X2, small tooth; 24 *a*, *b c*, X2, elliptical tooth. *Chester limestone, lower fish bed. XI.* — Note. A beautiful suite of these forms is in Mr. Van Horne's collection; closely related to *T. sculptus* of the *St. Louis limestone*, but the convex face less uniformly depressed, crown folds less prominent, roughness coarser, root stronger, deeper and less oblique outwards.

XI.



Geol. Ill. VI, pl. XI.

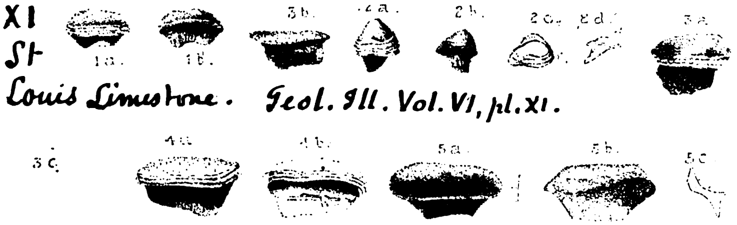
Tanaodus prænuntius, St. John & Worthen, Geo. Sur., Ill., Vol. 6, 1875, page 371, plate 11, figs. 6 *a*, concave face of fish tooth, *b*, opposite face *c*, outline of crown from above; 7*a*, view from above of stronger specimen, *b*, convex aspect, 8*a*, laterally arched tooth; 9*a*, its concave face; 10 *a*, *b*, two faces of a small tooth. *St. Louis limestone. XI.*



XI. St. Louis L.

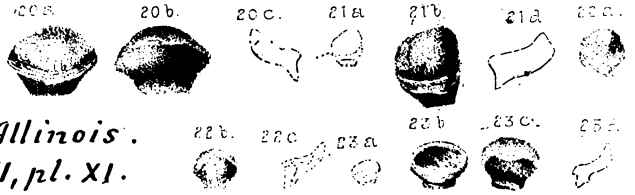
Geol. Illinois Vol. VI, pl. XI.

Tanaodus pumilis. St. John & Worthen, Geo. Sur. Ill., Vol. 6, 1875, page 369, plate 11, figs. 1*a*, perfect tooth, medium size, normal form, concave face, *b*, convex face, *c*, profile; 2*a*, small triangular tooth, concave face, *b*, opposite face, *c*, outline of crown from above, *d*, profile; 3*a*. larger tooth with worn crest; 4*a*, still larger, crest worn down plane with the margin, *b*, convex face restored; 5*a*, x2, concave face of immature tooth, enamel gone. *St. Louis limestone* at Pella, Iowa. *XI.*



XI St Louis Limestone. Geol. Ill. Vol. VI, pl. XI.

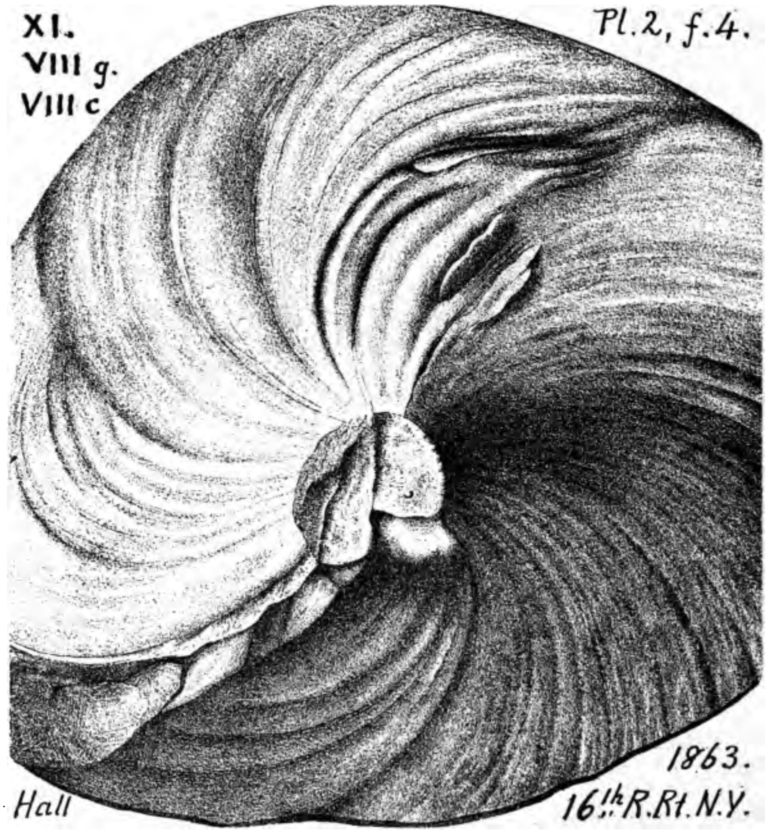
Tanaodus sculptus. St. John & Worthen, Geo. Sur. Ill., Vol. 6, 1875, page 373, plate 11, figs. 20 *a*, *b*, *c*, large symmetrical tooth; 21, 22, small symmetrical teeth; 23 *a*, outline of concave face, *b*, X 2, concave face, *c*, convex face showing crown folds, *d*, profile outline of a perfect root and unusual concavity of concave face. *St. Louis limestone. XI.*



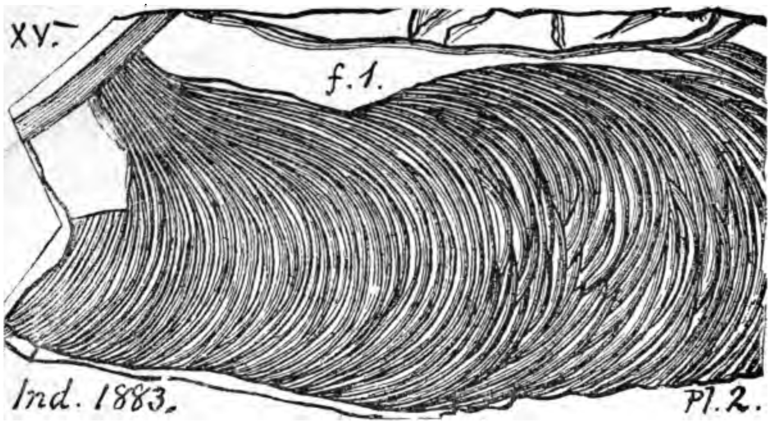
XI. St. Louis. Lime.

Geol. Illinois. Vol. VI, pl. XI.

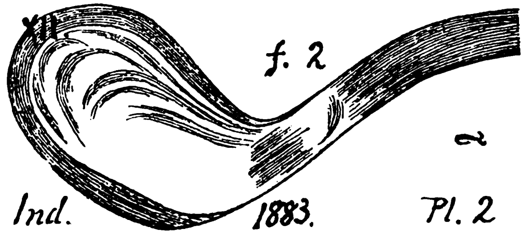
Tanaodus sublunatus. St. John & Worthen, Geo. Sur., Ill., Vol. 6. 1875, page 368, plate 11, figs. 27 *a*, *b*, from the *St. Louis* (*Subcarboniferous*) *limestone*, at Alton, Ill.—*XI.*



Taonurus crassus, (*Spirophyton crassum*, Hall, 16th Reg's Rt., N. Y., 1863, page 83, plate 2, fig. 4, a strong growing species [of seaweed] which attained a large size; in a specimen 5″ in diameter, the margins are separated by half an inch of stony matter, and the whorl is raised nearly an inch. It is said by White to crowd the limy beds of the *Hamilton upper sandstone* in Huntingdon Co., Pa., covering the surfaces of almost all the layers for a thickness of thirty or forty feet. (T3, 110.)—It is assigned by Hall to the greenish gray shaly sandstone below the *Conglomerate*, *XII*, at Cuyahoga falls, Ohio; but he has a very similar species from *Chemung strata* in New York. (See his remarks on the possible vertical range of these sea weeds, on p. 83.) — *VIIIc. to XI.*

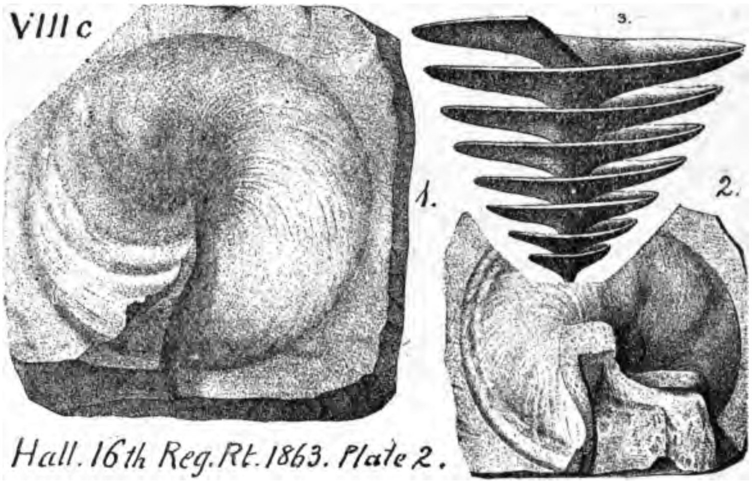

XV.
f. 1.
Ind. 1883.
Pl. 2.

Taonurus colletti. Lesq. (*Chondrites colletti*, Lesquereux, Illinois Report, 4, p. 379.) — Coal Flora of Pa., 1880, page 7, plate A, fig. 7, — closely allied to *Spirophyton typum*, Hall, 16th An. Rt. Nat. Hist. N. Y., p. 80, and woodcut, — horizon of Illinois coal 5, also near base of Missouri coal measures.) — Collett's Ind. Rt. 1883, page 35, plate 2, fig. 1. **Taonurus** is a genus established by Fisch. Ost. called **Fucoides** by Vanuxem, *Spirophyton* by Hall, *Physophycus* by Schimper, *Cancellophycus ?* by Saporta.—*Coal measures. XIII.*



Taonurus marginatus. Lesquereux, Coal Flora, 1880, page 7, 9, plate A, figs. 1, 2. — Collet's Indiana Report of 1883, plate 2, fig. 1, 2. — *Caulerpites marginatus*. Lesq. in Trans. of Amer. Phil. Soc. Phila., Vol. 13, p. 314, plate 7. *Physophycus marginatus*, Schimper, Coal Flora of Pa., 1880, page 7, plate A, figs. 1 to 6; distantly related to *Physophycus andrœi*, Stur, Culm Flora, pl. 26. — In *Mercer shale* at Wirtemberg, Slippery Rock creek, Lawrence Co., Pa. — In Lawrence Co., Pa., in *Mercer lower* and *upper limestones*, bet. middle and upper divisions of *Pottsville conglomerate.* (Q2, 61, 78.) *XII.* — See an interesting and important discussion of the whole subject of Palæozoic seaweed life in Report J, 1875, pp. 97, 98, 99, 102.

Taonurus typus. (*Spirophyton typum*, Hall, 16th Regents' Report, N. Y., 1863, page 80, plate 2, figs. 1, upper side of frond at about the 6th or 7th whorl from the base. Dark line of shadow from center to lower side indicates the thickness of the stone between the whorls; 2, cross section, two whorls lower, looking on the lower side; 3, partial restoration of the plant from a study of various specimens. Other irregular less vigorous growths abound in the same soft *Hamilton shales*, in Otsego and Madison counties, N. Y., and elsewhere. — *VIII c.*

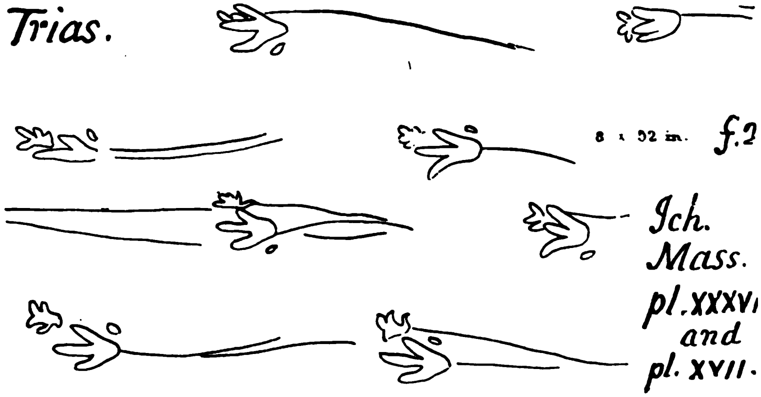


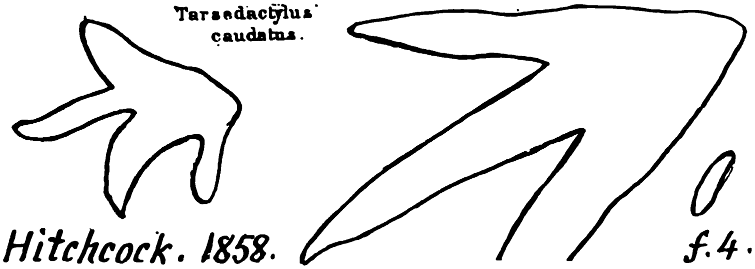
Hall. 16th Reg. Rt. 1863. Plate 2.

Tapirus americanus, Cope. Numerous teeth, belonging to several individuals, some of them as large as and quite like those of the modern S. Amer. tapir, were found in the Port Kennedy cave earth, Chester Co., Pa., Cope, Proc. A. P. S., 1871, p. 95. — *Postpleiocene. PP.*

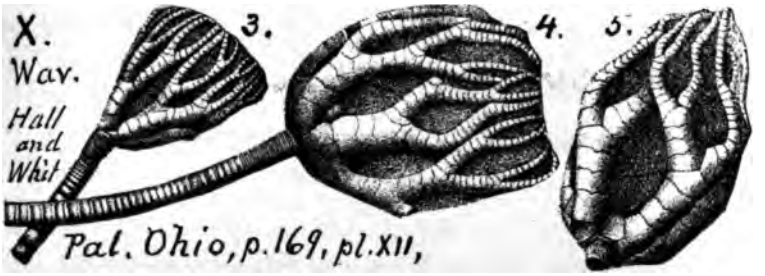
Tapirus haysii, Leidy. (Holmes' Postpliocene. Foss. S. C. plate 17. Teeth and bones, in the Port Kennedy cave. — *PP.*

Tarsodactylus caudatus *tracks.* Hitchcock. Ich. Mass., 1868, page 99, plate 17, fig. 4, *natural size*, outline of hind foot, with four fat toes, one pointed backward, and fore foot, with five fat toes; plate 36, fig. 2, *reduced* view of eight footprints in two rows on one of Mr. Fields' slabs at Turner's falls; length of step (hind foot) 5½ to 7 inches; trace of tail nearly straight, scarcely more than $\frac{1}{10}$ inch wide; hind foot print very bird like; fore foot print like that of a lizard or frog, with which the tail track agrees, and also the distance between the two rows (width of track way, 7 inches.) *Trias.*


Trias.
8 x 32 in.
f.2
Ich. Mass. pl. XXXVI and pl. XVII.

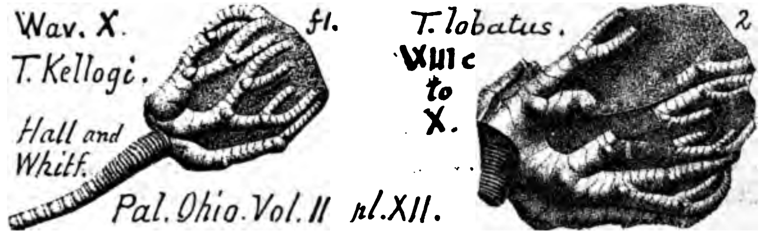

Tarsodactylus caudatus.
Hitchcock. 1858.
f.4.

Taxocrinus communis, (*Forbesiscrinus communis*) Hall



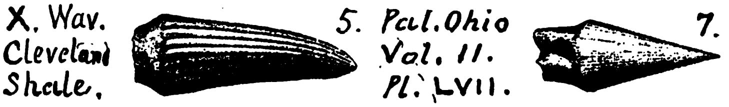
Crin. Waverly Sandstone, Ohio, 1863 — Hall & Whitfield, in Pal. Ohio, Vol. 2, 1875, page 169, plate 12, fig. 3, a young crinoid; 4, a large well preserved one, with body, arms, and column, and a few interradial plates; 5, the anal side of a third. This *Waverly* species has the lower part of its body like those of the Crawfordsville, Ind., Subcarboniferous (*Keokuk*) limestone, without interradial plates, and only one anal plate. All the *Carboniferous* species which have regularly forking arms, have numerous interradial plates. This is therefore a synthetic type. Richfield, O. *Waverly*. *X*.

Taxocrinus (*Forbesiocrinus*) **kelloggi,** Hall, 17th Rt. N. Y., 1864. Crin. Waverly Sandstone, Ohio, 1863. — Hall & Whitfield in Pal. Ohio, Vol. 2, 1875, page 171, plate 12, fig. 1, type specimen. Richfield, Ohio, *Waverly shales*. *X*.

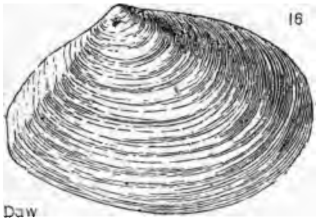

Wav. X.
T. Kellogi.
Hall and Whitf.
f1.
Pal. Ohio. Vol. II pl. XII.
T. lobatus.
VIII c to X.
2

Taxocrinus lobatus, var. **tardus,** Hall, 15th Reg. Rep. N. Y., 1862. Pal. Ohio, Vol. 2, 1875, page 170, plate 12, fig. 2, (included in preceding cut.) No essential difference between this *Waverly* (*Pocono*) fossil crinoid, and the T. *lobatus* of the New York *upper Hamilton* formation (Hall's 15th Rt. St. Cab. p. 124), but the difference in *age* is "greater than we know in any other species of this family of fossils. At the same time we know of several species of Lamellibranchiate fossils which extend from the *Hamilton* to the Waverly." (Hall.) *X*.

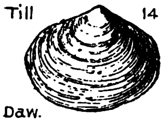
Teeth of fish found in the *Cleveland* (*Waverly*) *shale* of Ohio, together with myriads of *Conodonts* or teeth of **Worms** (which see below). Newberry, Pal. Ohio, Vol. 2, page 41, plate 57, figs. 5, 7. — *X*.



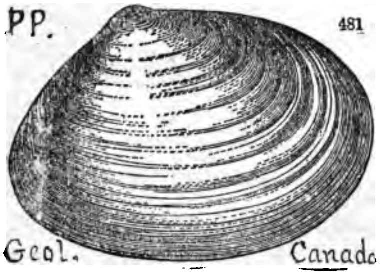
Tellina calcarea, (*Macorna sabulosa*, Stp.) Dawson's Acadian Geology, 1868, page 75, fig. 16, over boulder clay at St. John, and in *Leda clay*, Canada.— *Glacial PP.*



Tellina groenlandica, (*T. balthica*, Linn.) Dawson's Acadian Geology, 1868, page 74, fig. 14; over boulder clay at St. John. Geology of Canada, 1863, page 964, fig. 480, in the *Leda clay* and *Saxicava sand*. *PP.*

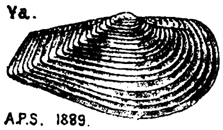


Tellina proxima, Brown. Geology of Canada, 1863, page 964, fig. 481, from the clay and sand deposits left by the great ice sheet, in the then water basin of the St. Lawrence. None have been seen in the Glacial or Post Glacial clays of the rivers of Pennsylvania. *PP.*



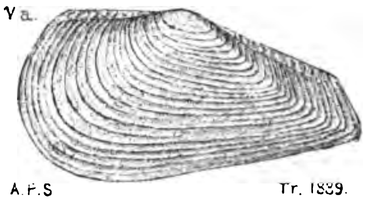
Tellinomya attenuata, Dawson's Acadian Geology, 1868, page 602, fig. 208; shell thick; resembles *T. machæriformis*, Hall, of the N. Y. *Clinton formation*, but the front end is longer and more regularly round, the hind end narrower and thinner, and the shell more convex; small and longer than T. *nasuta*, Hall, of the N. Y. *Trenton limestone*. Arisaig, N. S.— *V?*

Tellinomya (*Palæoneilo*) **cuneata**, *new species*, Simpson, Trans. Amer. Phil. Soc. Philada., 1889, page 453, fig. 21. Based on specs. 501 - 20, - 24, - 200, - 201, — from over McKees' fossil ore bank, Mifflin Co., Pa.; Spec. 502 - 16, McKeesville ore bank; Spec. 508 - 4,

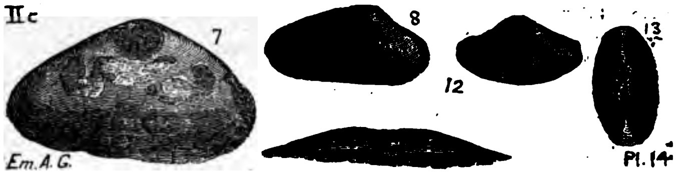


-5, -15, from *Clinton lime shales*, Orbisonia, Hunt. Co.— Shell small, ovate cuneate in outline; length twice the height; basal margin broadly rounding, becoming constricted or arcuate at about one-third the length of the shell from the anterior end; posterior margin short, obliquely truncated; cardinal line essentially straight, sloping at nearly the same angle anteriorly and posteriorly to the beaks; anterior end large and regularly rounded. Greatest convexity of the valves above the middle and in the umbonal region. Beaks about central, slightly incurved, extending a little above the hinge line; umbonal ridge clearly defined, subangular; posterior slope declining regularly and abruptly to the cardinal line. Below the umbonal ridge there is a broad shallow depression, extending from near the beaks to the base and constricting the basal margin. Surface marked by strong, lamellose, concentric striæ at regular distances apart, and by very fine concentric lines between the lamellose striæ. On the specimens observed there are eight or nine transverse teeth on each side of the beak. The specimens measured have a length of 12 mm., and a height of 6 mm. This species may be distinguished from *T.* (*P.*) *diminuens* of this formation by its smaller size, more distinct lamellose striations and the less abrupt constriction of the posterior portion.— *Va.*

Tellinomya (*Palæoneilo*) **diminuens**, *new species*, Simpson, Trans. Amer. Phil. Soc. Philada, 1889, page 453, fig. 22. Based on the specimen 501-43, from McKees fossil ore bank, Miffin Co., Pa. Also spec. 502 - 10, over ore bank near McKeysville. This species is very similar to the preceding, but is usually larger, the specimens observed having a length of from 23 to 25 mm., and a height of 11 or 12 mm. The posterior portion is more abruptly constricted, the lamellose striations are not so prominent and are more closely arranged.— *Va.*

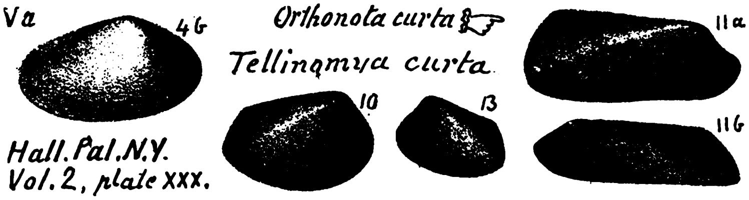


Tellinomya dubia. (Hall, Pal. N. Y., Vol. 1, *Black River* and *Trenton.*) Emmons. A. G, 170, plate 14, figs. 7, 8, 12, 13. Shell thin, small; common at Loraine, Watertown; Middle-



ville, N. Y., in *Trenton limestone*. *II c*.

Tellinomya elliptica, Hall, Pal. N. Y. Vol. 2, 1852, page



102, plate 30, fig. 4 *b*. found in the Upper grey *Clinton* sandstone in Herkimer Co., N. Y. Its beak is nearer the center than in the allied *T. curta* (which see, as figs. 10, and 13, of plate 27, included in the above cut. Figs. 11*a*, *b*, of *Orthonota curta* are added for comparison. — Compare also, *Glossites ellipticus*, Hall, Pal. N. Y. Vol. 5, 1885, page 498, pl. 96, fig. 8, which represents a specimen so complete as to possess even its strong hinge ligament extending from the beaks. This occurs however in the fine grained *Chemung* sandstone at Mansfield, Tioga Co., Pa. — *Glossites lingualis*, pl. 40, fig. 16 to 19, and pl. 96, fig. 9 to 11, is found at Phillipsburg, N. Y. and also at Mansfield, Pa. — *Glossites rudicula*, pl. 96, fig. 17, is from *Chemung* red sandstone, at Nelson, Tioga Co., Pa., *G. procerus*, pl. 96, f. 13; *G. subnasutus*, f. 14, and *G. patulus*, f, 15, 16, are all from *Chemung strata* at Mansfield, Pa.) — *T. elliptica* occurs in the *Clinton* lime shales over *fossil ore* west of McKeesville, Mifflin Co., Pa. (OOO, p. 194, 195. Specimens 501–46, 502–21.— *V a*. — *For figures of the above species see 1167.*

T. gibberula, Salter. Canada Org. Rem. *II c*.

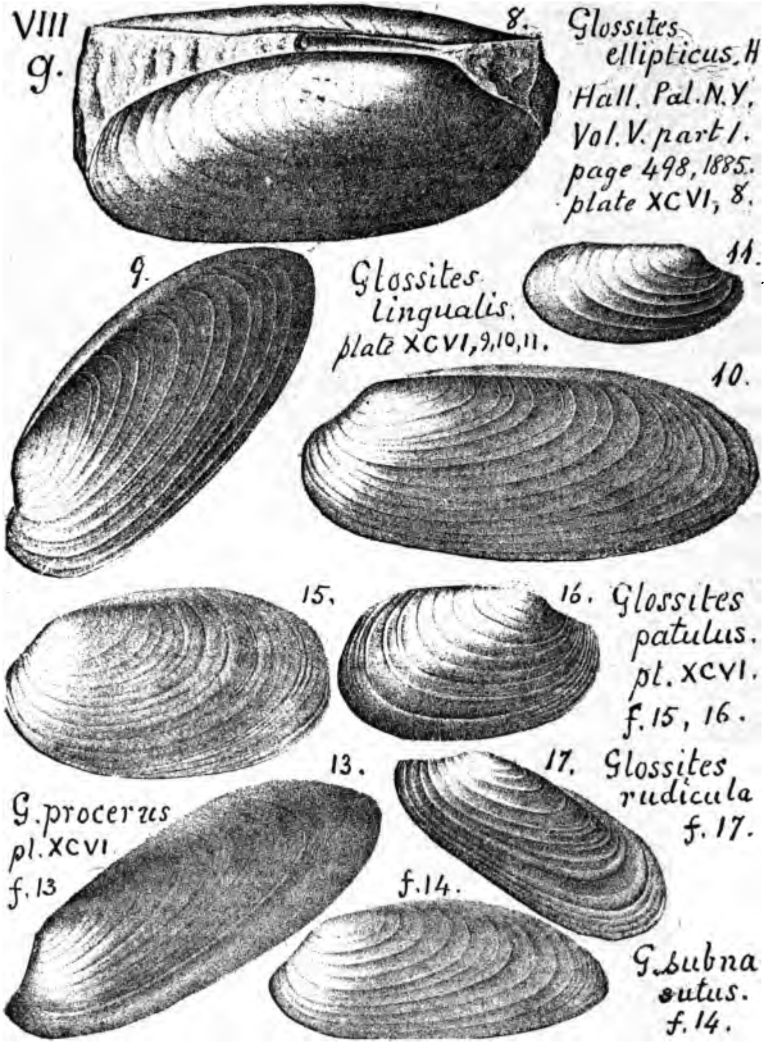
T. hamburgensis, Walcott. U. S. Mon. VIII. *II c*.

T. hilli, S. A. Miller. Cin. Q. J. S. 1874. *III b*.

T. houghtoni, Stevens. Am. J. S. XXV. *X*.

T. inflata, Hall. Geol. Wisc. 1861. *II c*.

(Figures for comparison with Tellinomya, p. 1166.


VIII
g.
8.
Glossites ellipticus. H
Hall. Pal. N.Y. Vol. V. part 1. page 498, 1885. plate XCVI, 8.
9.
Glossites lingualis. plate XCVI, 9, 10, 11.
11.
10.
15.
16.
Glossites patulus. pl. XCVI. f. 15, 16.
13.
17.
Glossites rudicula f. 17.
G. procerus pl. XCVI f. 13
f. 14.
G. subnasutus. f. 14.

T. iphigenia, Bill. Pal. Foss. I. *III b.*

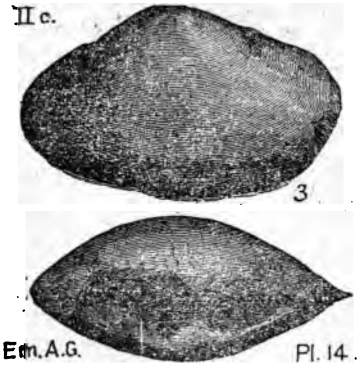
T. lata, Hall. Pal. N. Y. II. *V a.*

T. logani, Salter. Rept. Br. Ass. 1851. *III b.*

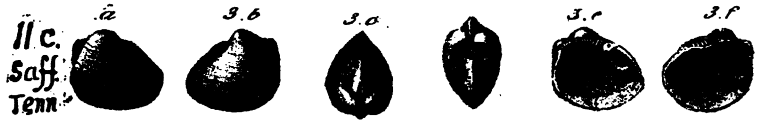
T. nucleiformis, Pal. N. Y. III. *VI.*

T. ovata, Hall. Geol. Wisc. 1861. *II c.*

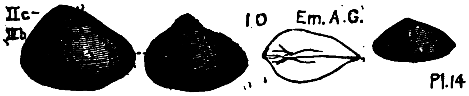
Tellinomya gibbosa. (Hall, Pal. N. Y. Vol. 1, 1847, Black River and Trenton group. Emmons, American Geology, Vol. 1, part 2, 1855, page 170, plate 14, fig. 3; shell thin, thickened at the beaks; sinus of the base quite shallow.—In *Trenton limestone.* *II c.*

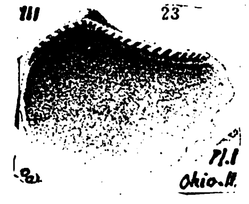

II c.
3
Em. A.G.
Pl. 14.

Tellinomya (*Ctenodonta*) **hartsvillensis,** Safford. Geol. Tenn. 1869, page 287, plate 2 (F), figs, 3*a* to 3*f*, found in the *Middle Nashville* (*Lower Hudson river*) formation in Tennessee. *III b.*

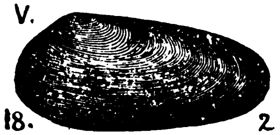


Tellinomya levata. (*Nucula levata*, Hall, Pal. N. Y. Vol. 1, 1847, *Black River*, *Trenton*, and *Hud. Riv. groups*). *Leda levata*, Emmons, Amer. Geol. I, ii, 1855, 173, pl. 14, fig. 10, variably oval shell, etc. *Trenton* and *Loraine formations.* — See Pal. Ohio, Vol. 2, 1875, page 82, plate 1, fig. 23, *enlarged* view of the hinge of an imperfect specimen. Species readily distinguished by the curvature of the hinge plate beneath and behind the beaks. Cincinnati. *Hudson river flags. III b.*

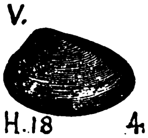




Tellinomya lineata (*Nucula lineata*). Hall, Geol. Fourth Dist. N. Y. 1843, page 196, fig. 78, 5. *Hamilton.* (See Phillips, Pal. Foss. 1836, page 37, plate 18, fig. 64.) *VIII c.*

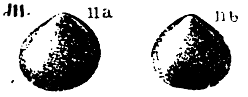


Tellinomya machæriformis. (*Nucula machæriformis.*) Hall, Geol. N. Y. 1843, page 76, fig. 18, 2. *Clinton.* In Pennsylvania, found as Spec. 502–44 in the shales above the McKee's *fossil ore bank*, Mifflin Co. *V a.*



Tellinomya mactræformis. (*Nucula mactræformis.*) Hall, Geology of Fourth District of New York, 1843, page 76, fig. 18,. *Clinton formation. V a.*

Tellinomya nasuta. (Hall, Pal. N. Y. Vol. 1, 1847, Black River and Trenton group.) *Lyonsia nasuta*, Emmons, Am. Geol. I, ii, 1855, page 170, plate 17, fig. 4; shell thin; base with shallow sinus; surface marked with fine concentric lines. Middleville, N. Y, *Trenton ton limestone. II c.*



Tellinomya ? obliqua ? (*Nucula obliqua*, Hall, Amer. Jour. Sci. Vol. 43, 1845.) Pal. Ohio, Vol. 1, 1873, page 139, plate II, fig. 11 *a*, *b*, *magnified 10 diameters*, right and dorsal views of an internal cast; 11 *c*, dorsal view of same [sic.]. If it be not the same as Hall's species, it may be named *T. microsperma*. Compare Portlock's *Silurian* English shell *Arca obliqua*, 1843. Cincinnati, O, tops of hills. *Hudson river formation. III b.*

Tellinomya pectunculoides, Hall. Pamphlet, *Cin. group.* 1871. — Pal. Ohio, Vol. 2, 1875, page 81, plate 1, fig. 24, *enlarged* interior of one of a group of exfoliated specimens on a slab, some retaining enough of the shell to show a smooth unmarked surface; rounder than *T. levata*, and *Lyrodesma cincinnatiensis.* Cincinnati, O. *Hudson river formation. III b.*

Tellinomya —— ? Rogers' Geol. Penn. 1858, page 833. *Coal measures. XIII.*

Tellinomya protensa, Hall. Stan. Ex. 1852. *XIII.*

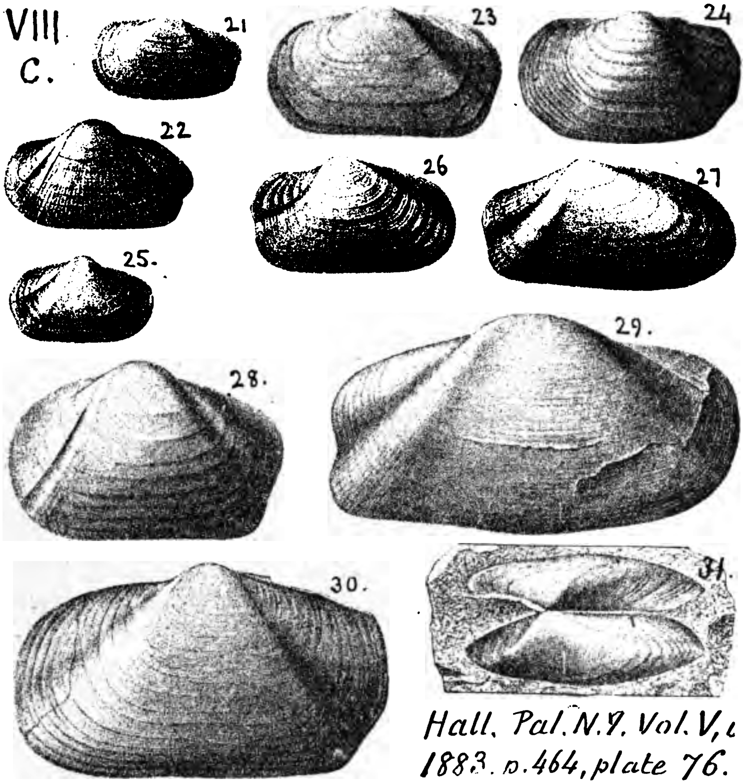
T. sanguinolarioidea, Hall. Pal. N. Y. I. *III c.*

T. (*Nucula*) **stella,** Winchell, Proc. A. N. S. 1862. *XIII.*

T. ventricosa, Hall, Geol. Wisc. Geol. Ill. 1861. *I c.*

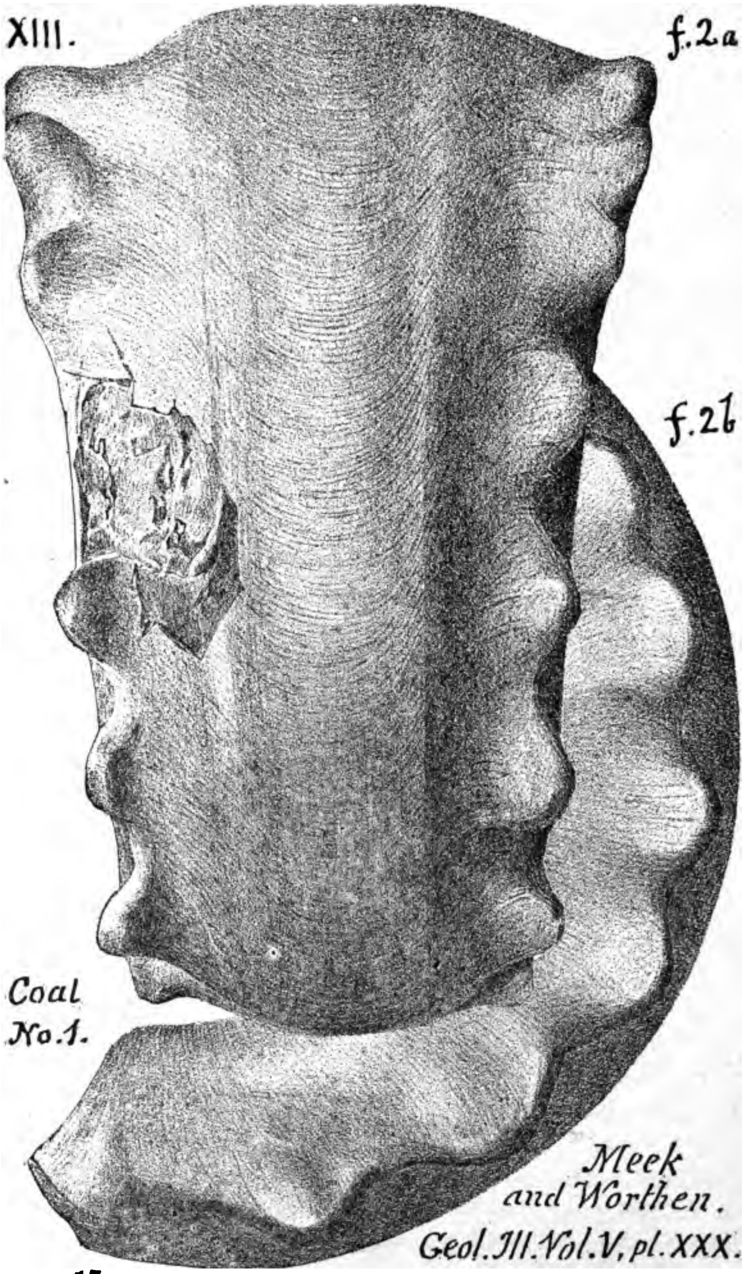
Tellinopsis subemarginata (*Nuculites subemarginatus,* Conrad. Jour. Acad. Nat. Sc. Phila. Vol. 8, 1842, *Hamilton.*) Hall, Pal. N. Y. Vol. 5, part 1, 1883, page 464, plate 76, figs. 21 to 31, a series to show variations in form of shell, which is distinguished from all others by the central position of its beaks, the emarginate hind end, and the peculiar radiating striæ; the concentric striæ, sometimes in bundles, make waves on the surface. On the lakes of N. Y. it is found in *Hamilton* shale. In Pennsylvania it was identified by James Hall (1888) in Spec. 804–4, –21, –64, from Marshall's falls, Monroe Co.; and in Spec. 808–8, –9, from Dingman's falls, Pike Co. *VIII c.*

VIII
C.



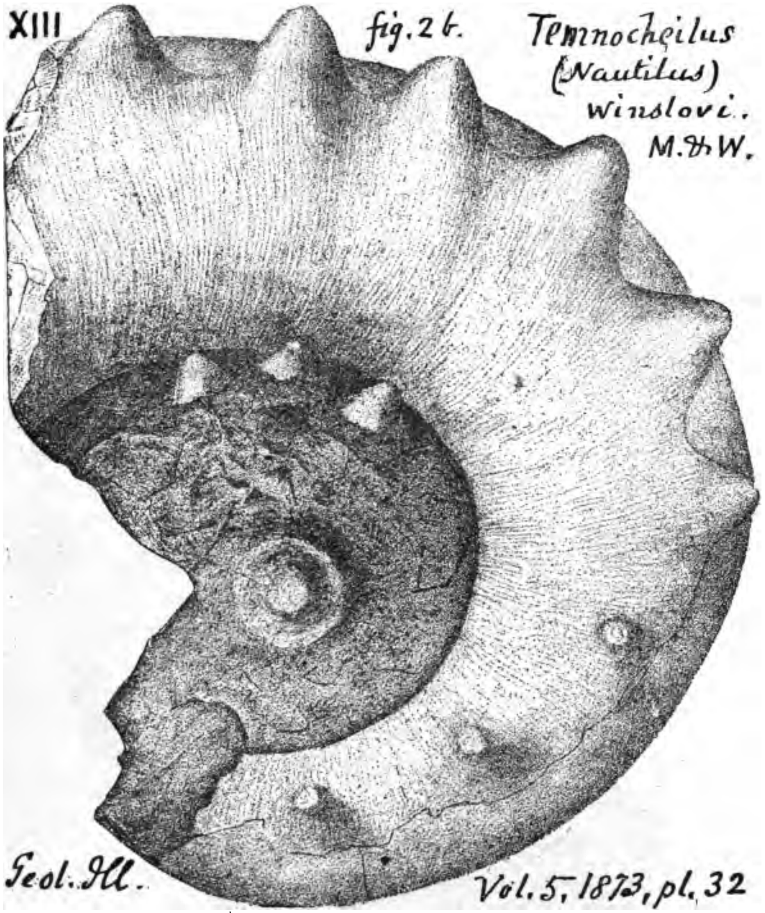
Hall, Pal. N.Y. Vol. V, i
1883. p.464, plate 76.

Temnocheilus (*Nautilus*) latus, Meek and Worthen, Geol.

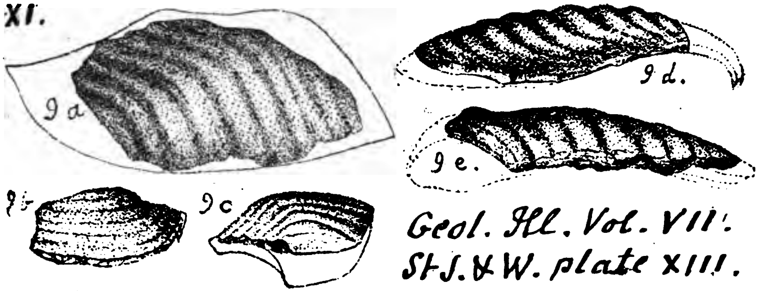


Illinois, Vol. 5, 18, page 608, plate 30, fig. 1 *a*, *b*, two views of a fine unique specimen found in the roof of *coal No.* 1 of the Illinois series in Carbon Cliff, Rock Island Co., Ill. About 16 nodes occupied each margin of the back of the last or outer whorl of the shell; no lengthwise lines on the surface, but the growth lines are moderately distinct; shell substance thin scarcely mineralized, but without pearly lustre. *XIII.*

Temnocheilus winslovi. See **Nautilus winslovi.** *XIII.*



Teniodus faciatus, St. John & Worthen, Geo. Sur. Ill., Vol. 7, 1883, page 76, plate 13, figs. 9 *a*, back jaw tooth of a fish of *Subcarboniferous age*, seen from above; *b*, from inner

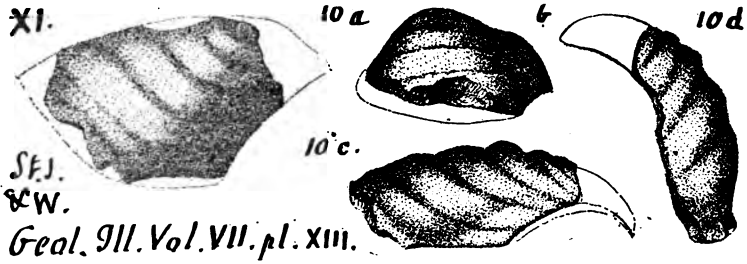


XI.

Geol. Ill. Vol. VII.
StJ. & W. plate XIII.

margin.; *c*, outer, enrolled margin; *d*, front side edge; *e*, hind-side edge. Alton, Ill. *Warsaw limestone. XI.*

Teniodus obliquus, St. John & Worthen, Geo. Sur. Ill,



XI.

StJ. &W.
Geol. Ill. Vol. VII. pl. XIII.

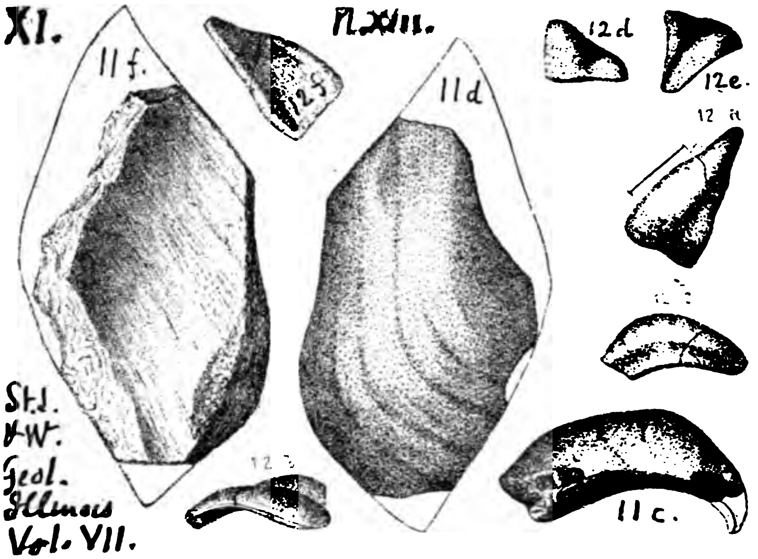
Vol. 7, 1883, page 78, plate 13, figs. 10*a*, back (right jaw) fish tooth seen from above; *b*, inner profile; *c*, front side edge; *d*, backside edge. Chester, Ill. *Chester limestone. XI.*

Teniodus regularis. St. John & Worthen, Geo. Sur. Ill., Vol. 7, 1883, page 77, plate 13, figs. 11*a*, left back jaw tooth of a fish of the *Subcarboniferous age*, *Warsaw limestone*, Bedford, Ind., seen from above; *b*, inner profile; *c*, outer inrolled edge; *d*, *c*, side views; 12 *a*, another from *Burlington limestone upper fish bed*, Iowa; *b*, *c*, *d*, *e*, edge views, *f*, under surface. *XI.* — *For figure see at top of page 1174.*)

Tentaculites. See **Cornulites.**

Tentaculites arenosus, Hall. (*For figure see* **T. attenuatus** *below.*) Illust. Dev. Foss. 1876. Pal. N. Y., Vol. V, ii, 1879, page 166, plate 31, fig. 1, internal cast; 2, *enlarged* to show thickness of a fragment of its shell left on the cast. Perhaps this species is identical with *T. elongatus.* (Hall.) Found in a limy layer of *Oriskany sandstone.* Albany Co., N. Y. *VII.*

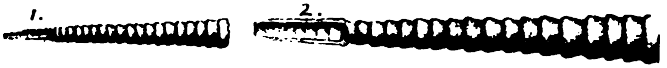
Figure of Teniodus regularis. Page 1173.



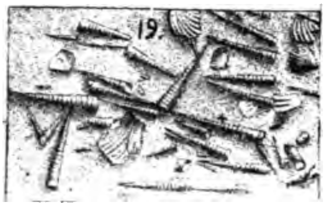
St.J. N.W. Geol. Illinois Vol. VII.

Tentaculites attenuatus, Hall. Illust. Devon Foss. 1876.

VII.



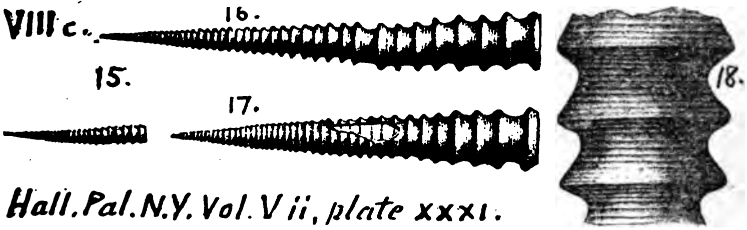
Tentaculites arenosus.
Hall: Pal. N.Y. Vol. V ii, pl. XXXI.
VIII c. *Tentac. attenuatus.*



Hamilton. Pal. N. Y., V ii, 1879, page 170, plate 31, fig. 19, gutta-percha cast of rock showing group of shells; 20, one of them *enlarged.* Much like *T. bellulus* on surface; but smaller and irregular in its rings; myriads of them occupy thin layers in the clay sandstone, Coopertown, N. Y., and elsewhere; and in Saddleback ridge, Huntingdon Co., Pa., with *Pterinea flabellum* and *Homalonotus dekayi;* and also in the Hamilton of West Canada. — In Pennsylvania White found it in Huntingdon Co., near Grafton, 50′ beneath the Tully limestone (T3, 109.) — In Perry Co., Claypole found it in Rattlesnake hill, Pisgah hill top, and Little Germany, 12,030, 12,110, 12,691, from *Hamilton upper shale*; and Crawley hill, 12,342, from the *Hamilton fossil ore bed. VIII c.*

Tentaculites bellulus, Hall, Pal. N. Y., Vol. V ii, page

VIII c.

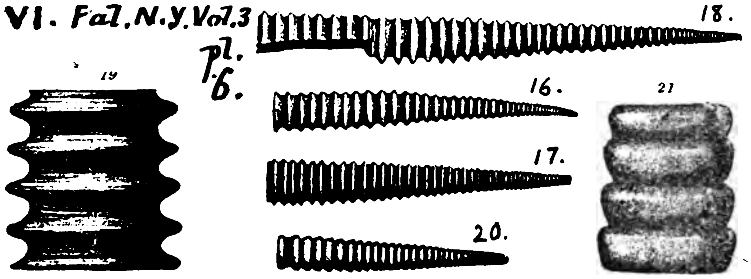


Hall. Pal. N.Y. Vol. V ii, plate XXXI.

169, plate 31, fig. 15, usual aspect; 16, ditto *enlarged;* 17, another *enlarged*, showing thinness of shell where broken; 18, *magnified* rings, showing more abrupt slopes downwards or towards the point of the shell, which differs from *T. scalariformis* in being slenderer, sharper at the point, and ringed more closely; more like *T. elongatus* of the *L. Helderberg*, but its rings not striated as in that species. *Upper Hamilton lime-shales* at various New York localities. *VIII c.*

Tentaculites elongatus, Hall. Pal. N. Y. Vol. 3, 1858,

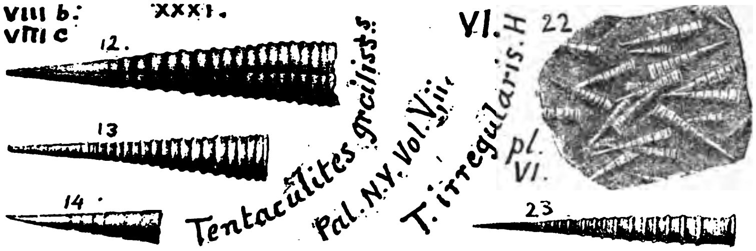
VI. Pal. N.Y. Vol. 3 pl. 6.



page 136, plate 6, fig. 16, medium size; 17, slightly compressed; 18, large, 3 inches long; 19, its striæ, *enlarged;* 20, exterior shell gone, leaving smooth rings, like a nest of crucibles, or series of cups set into each other, having all the character of *Cornulites.* 21, part of ditto, *enlarged.* In the *Shalg limestone* and in the *Upper Pentamerus limestone* (*Lower Helderberg*) of the Mohawk Valley.—On the Delaware river, Barrett found it in White's *Stormville limestone;* and in the *Stormville shale*, just under the *Oriskany* (G6, 132, 134;) and also in his *Oriskany shales.* (Possibly Hall's *T. arenosus* in the *Oriskany* of N. Y.,— *VI.*

Tentaculites fissurella. **Styliola fissurella.** *VIII b, c.*

Tentaculites gracilistriatus, (*T. fissurella*, Hall.) Hall,



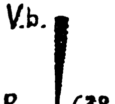
Pal. N. Y., Vol. 5, part 2, page 173, plate 31, fig. 12, 13, 14, three specimens *enlarged eight diameters;* minute and peculiar pteropod shells, of various aspects; rings sharply raised in limestone, rounded in shale, often weathered off smooth variable in distance apart; the only New York species having striæ lengthwise (except *T. distans* of the *Niagara* formation); occurs in the *Marcellus shale* and *limestone* at many places between Albany and Buffalo; also in *Hamilton soft shale* on Canandagua lake.— In Pennsylvania, Perry Co., Barnett's mill, Claypole got five specimens, 11,736 (OOO, p. 127), from *Hamilton upper shale.* *VIII c.*

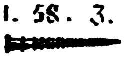
Tentaculites gyracanthus. Eaton thought it was a spine of a sea-urchin, or sea-egg, and therefor named it *Echinus gyracanthus*, Geol. Text book, 1832. Subsequently the shell proved to be an independent animal of the Wingfooted (*pteropod*) class.— In Pennsylvania it was recognized by Dr. Barrett on the Delaware in White's *Stormville limestone* (G, 6). In the Montour district Claypole found one specimen among White's collections from the upper half the same rock (G7, 101. —In Perry Co. he got spec. 11,806, 11,810, at Clark's mill, and 11,844 on Limestone ridge, all from the *Lower Held. upper shale* or *cherty beds.*— *VI.*

Tentaculites irregularis, Hall, Pal. N. Y. Vol. 3, 1859, page 137, plate 6, figs. 22 and 23. (Synonym: *T. ornatus*, Vanux. 1842, and Mather, p. 349, f. 3; but not the *T. ornatus* of Sowerby in Sil. Syst. p. 628, pl. 18, fig. 25, and Siluria, pl. 16, f. 11.) Fig. 22, a small part of a piece of *Tentaculite* (*Lower Helderberg*) *limestone* five inches long by one inch wide on which more than 500 of these little animal tubes can be counted; and the layer beneath, for the thickness of ¼ inch, is composed of them, giving ten times as many; fig. 23, one *enlarged.* — In Pennsylvania, White remarks (G7, 347) that this was the only *Tentaculite* seen by him in the Susquehanna river district, in the *Lower Helderberg limestone*, viz., near Selinsgrove; but he speaks doubtfully of the specific name, which in fact is a synonym of *T. gyracanthus.* *VI.* — See also the unnamed Spec. 608-26 (impressions) from Pike Co., the Hogback. *VI.* — *For figure see T. gracilistriatus.*

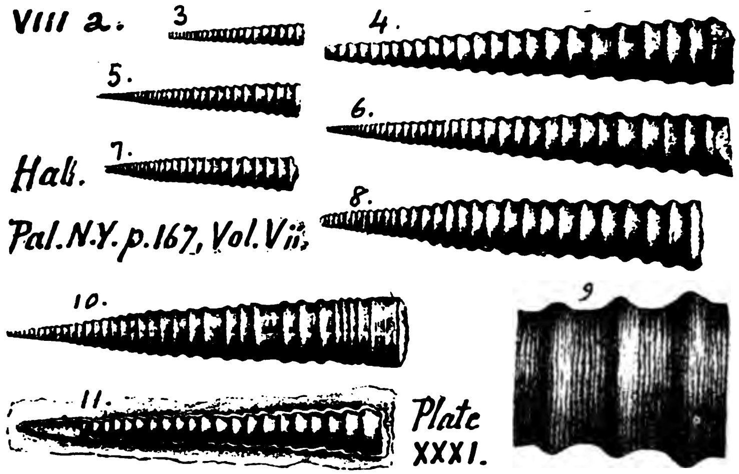
Tentaculites minutus, Hall. Geology of the Fourth District of New York, 1843, page 72, fig. 17, 11. *Clinton formation.* *Va.*

Tentaculites niagarensis, (see *ornatus*) Hall, Pal. N. Y., Vol. 2, 1852, page 352, plate 85, fig. 11 and 12, natural size, and portion *enlarged.* Hall thinks that it stands nearest the English *T. ornatus* of Sowerby. Is confined to the *Clinton upper beds*, and *Niagara lower limeshales*, in Central and Western New York. In fact, Hall adds, "among all the Niagara fossils from Iowa and Wisconsin, I have not recognized a single species of the genus," nor has a single *Tentaculite* been seen among the thousands of all classes of fossils collected at Waldron, Ohio. (Pal. N. Y. Vol. V ii, p. 156, 159, 160, 162.) *Niagara.* *Vb.*



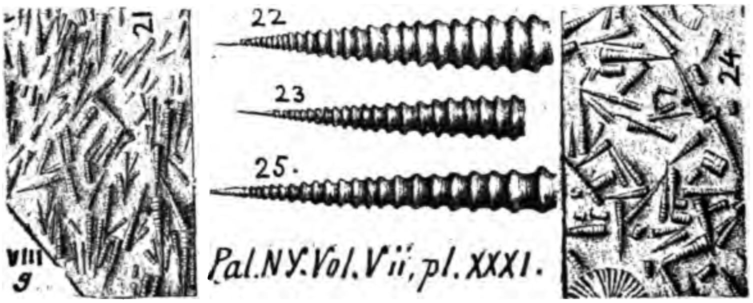


Tentaculites ornatus, Sowerby, in Murchison's Silurian system, 1839, page 628, plate 12, fig. 25. Hall, Geol. N. Y., 1843, p. 142, fig. 58, 3. Vanuxem, Geol. N. Y., 1842, p. 112, fig. 23, 3. *Waterlime* (giving however a figure of the species of the *Tentaculite limestone.*) In 1843, Mather repeated the figure as characteristic of the *T. limestone*, then considered *Upper Waterlime.* In 1863, Dana's manual followed them, and also Hall's error of 1843 as to *T. scalaris* of the *Corniferous.* Hall supposes its nearest American representative to be *T. niagarensis* of the *Niagara.* (Pal. N. Y. V ii, 1879, p. 156, 157, 159.) — Rogers, Geol. Pa., 1858, page 824, fig. 638. *Salina*, as found in Aughwick valley, Huntingdon Co., Pa. — *V b, c.*



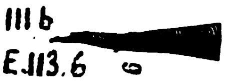
Tentaculites scalariformis, (*sicula*) Hall, Illust. Devon. Foss. 1876. *Upper Helderberg.* (So called because it resembles *T. scalaris*, Schlotheim, Petref. Vol. 29, European species.) — Geol. N. Y., 1843, page 172, fig. 68, 2. *Corniferous.* (See Murchison's Sil. Res. p. 643.) — Pal. N. Y. V ii, 1879, page 177, plate 31, f. 3, specimen from Cherty limestone, *Upper Helderberg;* 4, *enlarged;* 5, retaining its shell; 6, *enlarged* to show rings and encircling striæ; 7, a varied form; 8, *enlarged;* 9, the same still more *magnified* to show the irregularity of the striæ and their presence on the rings as well as grooves; 10, *enlarged* irregular rings; 11, *enlarged* to show thickness of broken shell. Abounds near Sandusky, Ohio. &c. In Pennsylvania, at Stroudsburg, 12,670 (OOO, p. 164). — *VIII a.*

Tentaculites spiculus, Hall, Illust. Devon. Foss. 1876,



Chemung. Pal. N. Y. V ii, page 172, plate 31, fig. 21, 24, gutta-percha impressions of fragment of *Chemung* rock; 22, 23, 25, *enlarged* individuals. Scarcely known except by imprints in clay sandstone. Resembles *T. attenuatus*, but with thicker rings and fewer and stronger striæ. — In New York, south of Ithaca, and Cortland. — In Pennsylvania, Catawissa section, bed 82, and sect. XI, bed 34, Roaring run sect. bed 3 (G7, 64, 239, 302.) *VIII- IX*, and *IX*. — Spec. 803 - 1 (large slab covered with them), 803 -1, -2, -3, -4, -5, (large slabs covered with them in hundreds); -11 (cast, with *Chonetes syrtalis*, verified by J. Hall, 1888) in C. E. Hall's collections at Orbisonia, Hunt. Co., from *Hamilton strata*, *VIII c*. — In Perry Co., Junkin's farm, Spec. 12,055 (three) in *Chemung-Catskill;* near Pinegrove, 12,562 (two) in *Chemung ;* Junction farm, Duncan's Island, 12,697 (two) in *King's mill sandstone*, *VIII- IX*.

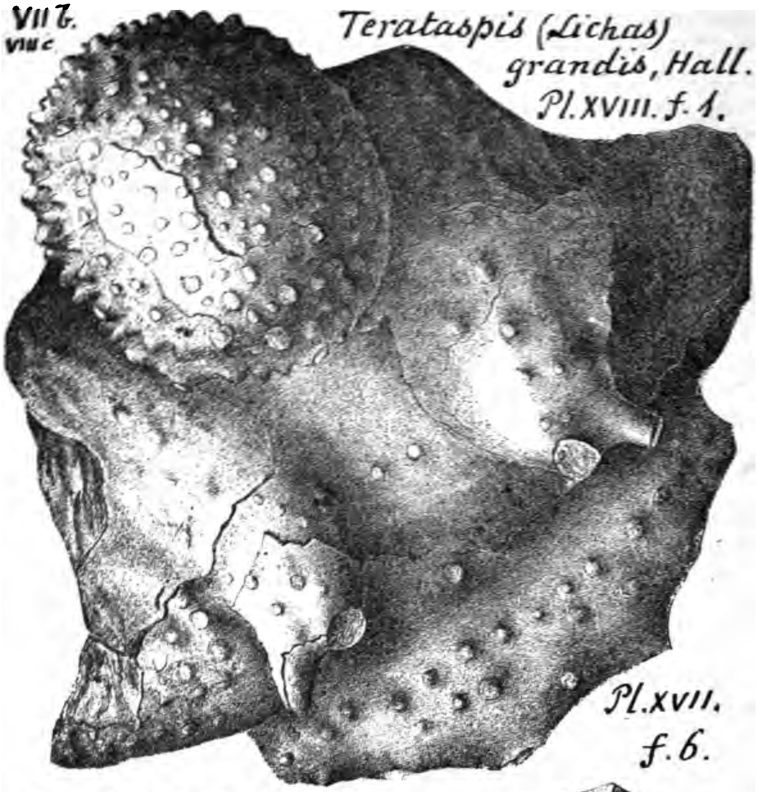
Tentaculites —— ? Emmons, Geol. of N. Y., 1842, page 404, fig. 113, 6. *Hudson river*. There are four species from this formation, at Cincinnati, given in Miller's Am. Pal. Fossils, to one of which this of Emmons may belong: *T. oswegoensis*, M. & W.; *richmondensis*, S. A. Miller; *sterlingensis*, M. & W., *tenuistriatus*, Meek & Worthen. *III b*. — The recorded *Trenton* species is: *T. incurvus*, Shumard, to which may belong the fragments (with *Lingula*, and *Trinucleus concentricus*) on specs. 203 -11, and those on a large slab, spec. 210-74 (with many beautiful *bryozoan* fragments), both collected by Hall & Fellows, at Bellefonte, Centre Co., *II c*. — Countless *Tentaculites* crowd the *Marcellus black* shale in the railroad cut at Grafton, Huntingdon Co. (T3, 114, and Spec. 12,731). — Ewing reports them in *Marcellus* in Center Co. (T4, 432). Claypole, also at Old Juniata furnace, Perry Co. (Spec. 12,283). *VIII b*. — Are numerous in the *Hamilton middle sandstones* in Huntingdon Co. (T, 32, 163, spec. 3601); and in the *upper* sandstone (T3, 111); also in Montebello Narrows, Perry Co. (Spec. 12,-565); and at Marshall's falls, Monroe Co. — *VIII c*.



Terataspis grandis (*Lichas grandis*, Hall, 15th Reg. Rept. N. Y. 1862, *Schoharie grit.*) — Pal. N. Y. Vol. VII, 1888, page 73, plates, 18, 1, upper view of the head of this large spiny trilobite, (only the glabella without the moveable cheeks,)

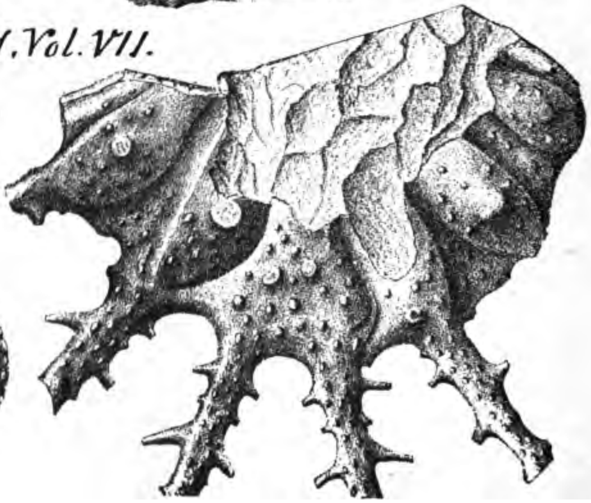
VII b.
VIII c

Teratuspis (Lichas) grandis, Hall.
Pl. XVIII. f. 1.

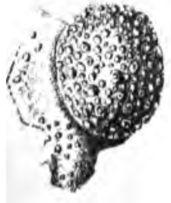


Pl. XVII.
f. 6.

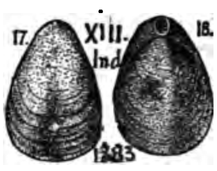
Pal. N. Y. Vol. VII.
1888.

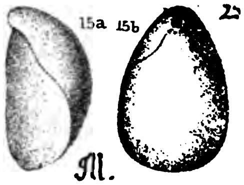


Pl. XIX
f. 5.



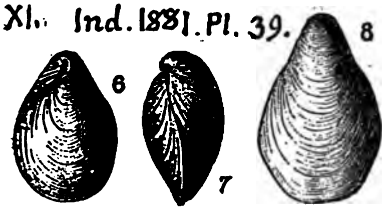
showing double spines on the side lobes, &c.; (2, omitted, gives a back view of it, showing the stumps of the spines;) specimen from the *Upper Helderberg* of Canada; plate 17, (1, 2, 3, 4, 5, omitted views of heads from Schoharie Co., N. Y.); 6, an imperfect tail piece (pygidium) also from the *Schoharie grit, VII, b;* plate 19, frontal lobe of a young specimen, with a fragment of the cheek attached; (six other figures of its spines, &c., omitted.) — In Pennsylvania an impression of part of this trilobite was found by Ashburner and C. E. Hall, just below the bridge over Aughwick creek in Saddleback ridge gap, Huntingdon Co. Specimen No. 803–14 (verified by J. Hall, Nov., 1888,) in *Hamilton strata* [?] — *VII b;* [*VIII c.?*]

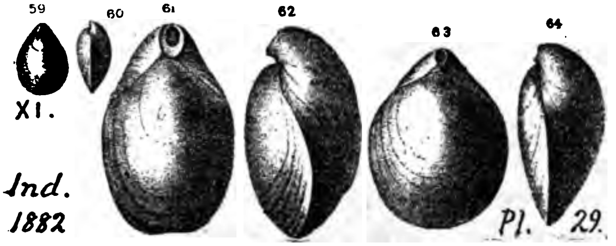




Terebratula bovidens, Morton, Amer. Jour. Science, Vol. 29, 1836, p. 150. — Collett's Indiana Report of 1883, page 137, plate 32, figs. 17, 18, 19, *natural size*, belly, back and side views. Species variable in size and shape. — Geol. Ill., Vol. 5, 1873, p. 572, plate 25, figs. 15 *a, b. Coal measures* from Ohio to Nevada; and in half a dozen counties in Indiana, *XIII.*

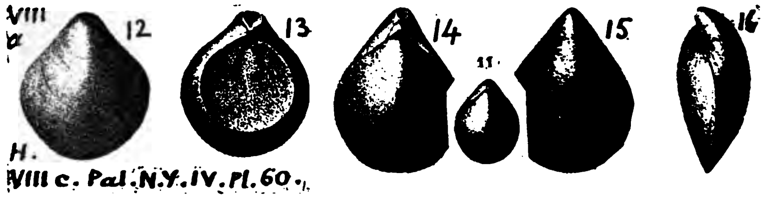
Terebratula cuneata. See **Rhynchonella cuneata,** *V b.*





Terebratula formosa. Hall (1858. Trans. Albany Inst. Vol. 4, page 6. Warsaw limestone) Collett's Indiana Report of 1881, page 361, plate 39, fig. 6, 7, back and side views of a moderately large example; fig. 8, ventral view of a larger one, all *natural size;* and considerably larger than Hall's types from the same locality, Spergen hill, Wash. Co., Ind. (*Warsaw L.*). *XI.* — Whitfield's Bull. 3, 1882, copied into Collett's Ind. Rt. 1882, page 337, plate 29, figs. 59 to 64. Young shells look like *Ter. turgida*, but grow to a much greater size and grow different.

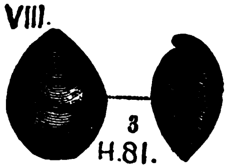
Terebratula harmonia, Hall, Pal. N. Y. Vol. 4, 1867, page 388, plate 60, fig. 11, young dorsal valve; 12, larger (Canada) ventral valve; 13, ditto, dorsal side cut down to show loop; 14, 15, 16, dorsal, ventral, and profile of a longer specimen from Falls of the Ohio, *Corniferous limestone*, *VIII a*. (Larger specimens are easily distinguished from *T. sullivanti* by greater width and longer beak, and the regular bow from beak to base of ventral valve.) — In Pennsylvania, Blair Co., found at Bell's mills, Spec. 805–2 (identified by Jas. Hall, Nov., 1888), in *Hamilton shale*. *VIII c*.



Terebratula imbricata. See **Atrypa imbricata.** *V b.*

Terebratula lacunosa. See **Atrypa lacunosa.** *VI.*

Terebratula laticosta. See **Atrypa laticosta.** (A variety with 6 instead of 3 ribs as in the English species; Phillips, Pal. Foss. 85, 153, xxxiv.) *VIII, g.*



Terebratula lincklæni, Hall, Pal. N. Y. Vol. 4, plate 60, fig. 61 to 63. The figure from Hall's Geol. 4th Dist. 1843, p. 202, fig. 81, 3, was wrongly placed under *Atrypa*, on page 62 of this Dictionary. (R. P. Whitfield.) — In Perry Co., Pa., four specimens (11,782) found by Claypole at Barnett's mill, in *Hamilton upper shale*. *VIII c.*

Terebratula lynx. See **Orthis lynx.** *II c*, *III b.*

Terebratula marcyi. Comp. **Eumetria verneuilliana.** *XI.*

Terbratula mormonii. See **Retzia mormonii.** *XIII.*

Terebratula pennata. See **Spirifera decemplicata.** *V b.*

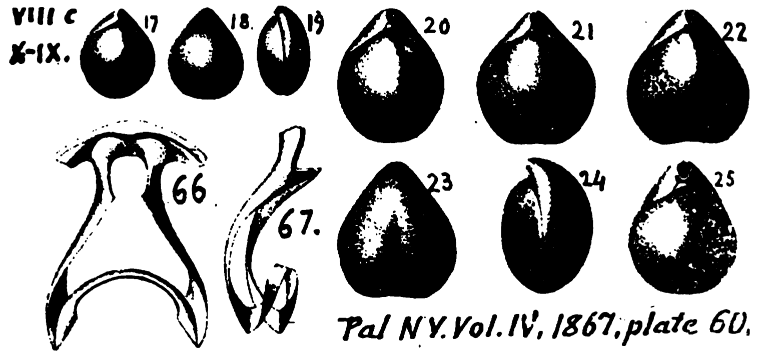
Terebratula prisgca. See **Atrypa prisca.** *VIII c.*

Terebratula rectirostra. **Cryptonella rectirostra.** *VIII c.*

Terebratula resupinata. See **Orthis resupinatus.** *VIII d.*

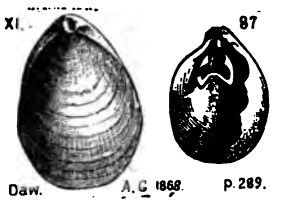
Terebratula reticularis. See **Atrypa prisca.** *VIII c.*

Terebratula roemingeri, Hall. 16th Reg. Rt. 1863, Pal. N. Y. Vol. 4, 1867, page 389, plate 60, fig. 17, 18, 19, large rotund form from N. Y. shore of Lake Erie; 20, 21, *enlarged twice*, two dorsal valves; 22, 23, 24, *enlarged twice*, from Michigan; 25, *enlarged twice*, dorsal valve with no sinus, nor emargination; 66, 67, *enlarged* ventral and profile of the loop. It is the smallest species of the genus, or of the family, found in the *Hamilton shales* of N. Y.; of common occurrence; and distinguished (if perfect) without trouble. *VIIIc.* — In Pennsylvania, Huntingdon Co., Pa., reported by I. C. White in the middle layers of the red siliceous *Trough creek limestone*, at top of *Pocono* (bottom of *Mauch Chunk*) (T3, 77). *X–XI.*



Pal N Y. Vol. IV, 1867, plate 60.

Terebratula sacculus, Martin. Dawson's Acadian Geology, 1868, page 289, fig. 97, showing the hole in the beak, characteristic of the *Terebratulidæ*, and the double loop supporting the gills; from the *Subcarboniferous limestone* of Nova Scotia. NOTE. — DeVerneuil identified it with the European *T. elongata* and *T. sufflata;* but Davidson placed all the variously shaped *terebratulas* of N. S. under *T. sacculus. XI.*

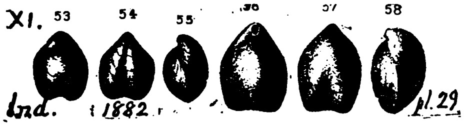


Terebratula sinuata. See **Spirifera decemplicata,** *V b.*

Terebratula serpentina (Belgium). Compare **Eumetria verneuilliana.** *XI.* Owen gives this name to an obscure specimen, figured in Geol. Wisconsin, Iowa and Minn. 1852, plate 3A, fig. 3, from carboniferous strata, Iowa. *XI? XIII?*

Terebratula subtilita, Hall. *See* **Athyris subtilita,** *on page 51 of this dictionary.* Large and abundant in the *Middle coal measures* of Iowa; its time range and land range both are extraordinary. In Europe it ranges vertically from *Permian* down to the *Subcarboniferous;* and probably several species from the American Subcarboniferous will turn out to be mere synonyms. (Keyes, 1888). *XIII–XVII.*—This is probably the species, or one of them, reported by Stevenson (List, Trans. Amer. Phil. Soc. Phila. Vol. 15, page 26) as abundant in the fossiliferous limestone of the *Barren* (*Pittsburgh*) *series* in S. W. Pennsylvania. *XIV.*

Tetrebratula turgida. (Hall, Trans. Alb. Inst. Vol, 4, 1856. Whitfield. Bull. 3, Am. Mus. 1882, plate 6, figs. 53 to 58). Collett's Ind. Rt. p. 336, plate 29, figs. 53, 54, 55, small typical size, 56, 57, 58, large specimens. Alton Ill.; Spergen Hill, etc., Ind. *Warsaw limestone. XI.*

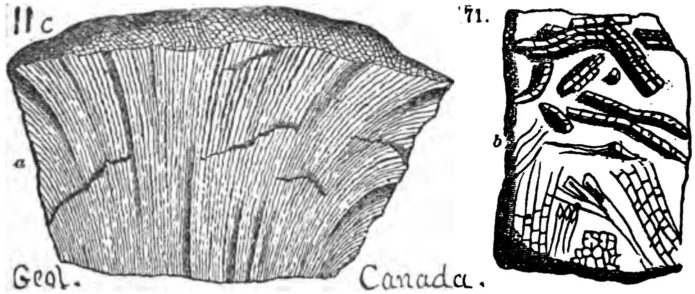


Terebratula uta. See **Rhynchonella uta.** *XIII.*

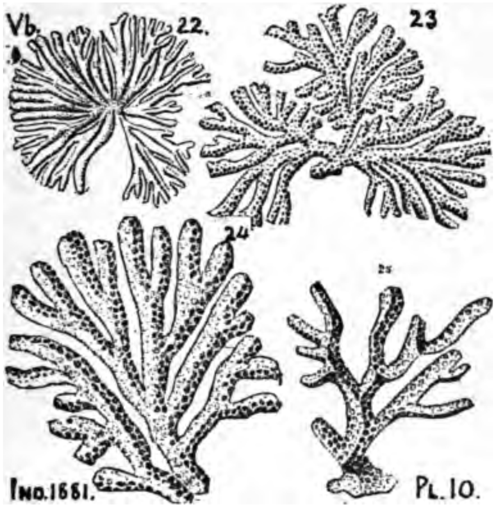
Termes contusus. See **Didymophleps.**

Termes longitudinalis, Scudder. (To be given another generic name after further study by Dr. Scudder). A flying insect in the collection of W. Lacoe at Pittston, Pa. Mem. Bost. S. N. H. Vol. 3, 1885, p. 350.

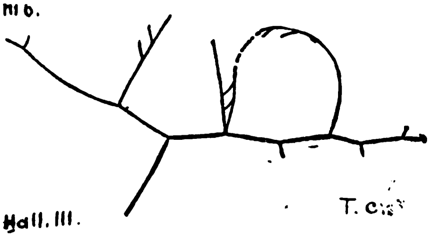
Tetradium fibratum, Safford. American Journal of Science, Vol. 22, 1856, *Cincinnati group.* Geology of Canada, 1863, page 139, fig. 71, gives this zoophyte of the *Trenton formation*, both whole as it grew, and its separated tubes scattered through the rock. *II c.*



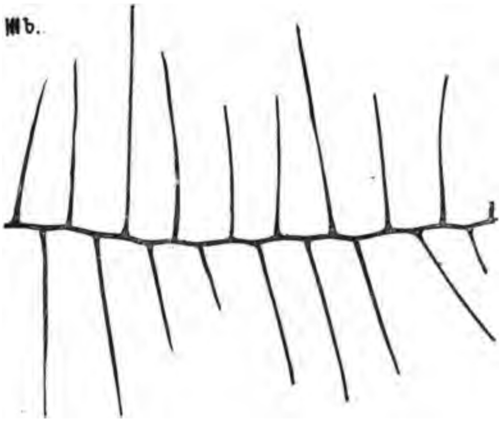
Thamiscus niagarensis, Hall, in Collett's Indiana Report of 1881, page 254, pl. 10, figs. 22–25. (Hall. 28th Report Museum, 1876 and 1879.) This is the only species of this genius described as found in the *Niagara formation*, *V*, *b*.

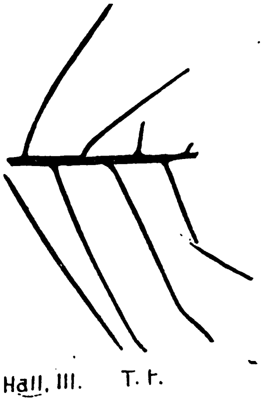


Thamnograptus capillaris. A graptolite of the Hudson river formation, figured by Hall, in Pal. N. Y. Vol. 3, 1859, page 520. *III b*.


III b.
Hall. III.
T. c.

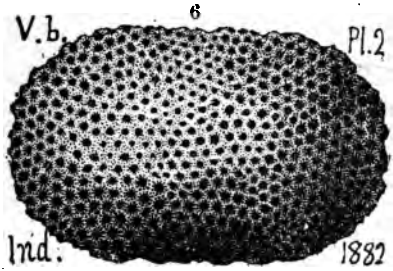
Thamnograptus typus, Hall. Pal. N. Y. III, 1859, page 520.—*III b*.





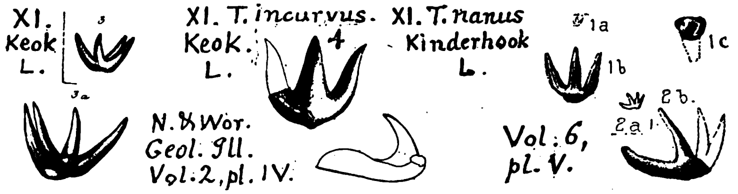
Theca primordialis. See **Hyolithes primordialis.** *I* (*U. C.*)

Thecia major, Rominger (1876, Foss. Corals, Geol. Survey of Michigan, Pal. page 67.) Collett's Indiana Report of 1882, page 253, plate 2, fig. 6 upper view of specimen.—*Niagara formation,* at many points of its outcrop in Indiana. *Vb.*



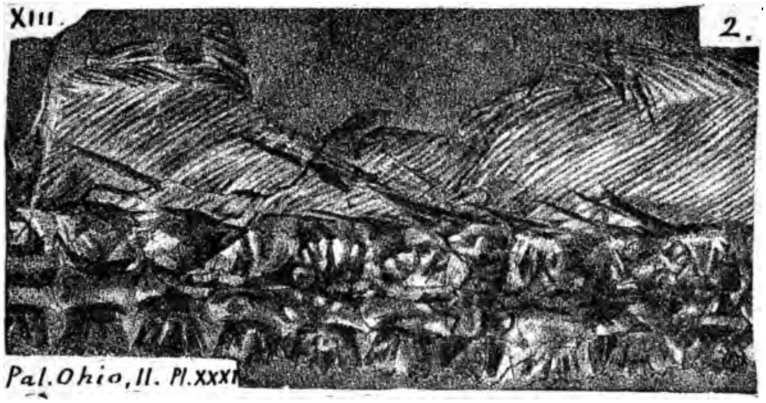
Thelodus parvidens. See, for figure, **Onchus tenuistriatus.**

Thrinacodus (*Diplodus*) **duplicatus.** Newberry & Worthen. Geo. Sur. Ill., Vol. 2, 1866, page 61, plate 4, figs. 3, a tooth of *nat. size,* 3*a*, opposite side *magnified.* Differs from *Diplodus gibbosus, D. gracilis,* &c., only in the striking fact of having four horns instead of two or three; but some species of *Diplodus* have the third (middle) horn shortened to one-half the length of the side horns, or reduced to a mere tubercle, or to nothing at all. Agassiz writes of having seen five on one tooth. Nauvoo, Ill., in *Keokuk* (*Subcarb.*) *limestone. XI.*

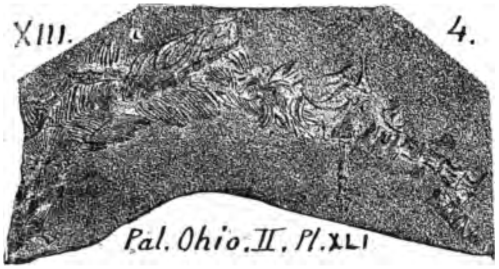


Thrinacodus (*Diplodus*) **incurvus.** N. and W. Geol., Ill., Vol. 2, plate 4, fig. 4; 4*a* is a side view of another specimen. (For these figures see under *T. duplicatus,* above.) Only one broken tooth of this kind was found; in the same place, and rock. *XI.*

Thrinacodus nanus. St. John & Worthen, Geo. Sur. Ill., Vol. 6, 1875, page 289, plate 5, figs. (*See above under T. duplicatus*) 1*a*, front view of the tooth; *b*, *enlarged;* *c*, its base seen from below; 2*a*, side view of another specimen, showing the base, *b*, *enlarged*, Burlington, Iowa; not uncommon in the upper fish bed of the *Kinderhook* (*Subcarb.*) *limestone*. *XI.*



Thyrsidium fasciculare, Cope. Pal. Ohio, Vol. 2, 1875 page 365, plate 41, fig. 4, *natural size;* type specimen of a species of Salamander of the Ohio *coal measures;* nine vertebræ, and corresponding ventral armature.—*XIII.*



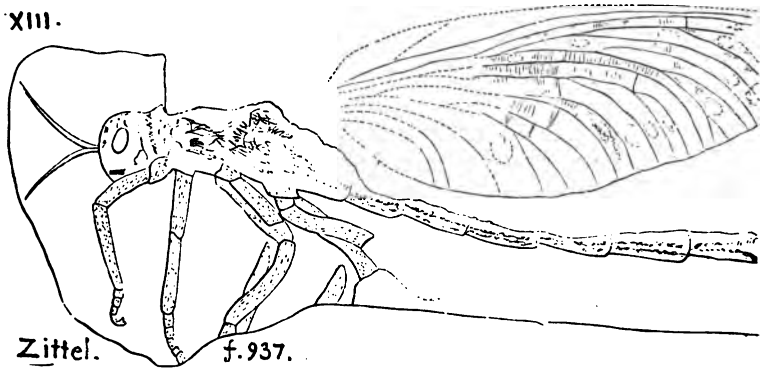
Thyrsidium? Cope. Pal. Ohio, Vol. 2, 1875, page 366, plate 31, fig. 2.

Tinoceras ingens, Marsh. A gigantic pachyderm with three pairs of stubby horns, or bosses perhaps covered with skin, of Eocene age found in the Green river basin, Wyoming. See Dr. R. W. Shufeldt's restoration of it in his "Remarks upon Extinct Mammals of United States," reprinted from the "American Field," Chicago, Vol. XXXII, 1889.

Titanichthys agassizii, Newberry. A monster placoderm fish of the Ohio *Cleveland shale*, even larger than the famous gigantic *Dinichthys*, and belonging to the same group as *Asterolepis* (*Homostius*, Pand.), *Heterostius*, and *Coccosteus* (specimens in B. Mus. are miniature copies of Dinicthys); discovered by Mr. J. Torrell, of Sheffield, Lorain Co., O., 1883; described and figured *one-ninth* and *one-sixth of size of nature*, head plates, jaw bones, &c., in Pal. Fish. N. A. Mon. U. S. G. Survey, 16, 1889, p. 130, plates 1, 2, 3, 4. Found associated with *Dinichthys* bones; head triangular, *four feet wide* and more; surface granulated, or smooth, and gracefully grooved; shoulder girdle bones remarkably massive and strong (corocoid ? 2′ long, thick as a man's arm; clavacles, 2′ and more, thin); lower jaws, 3′, slender rods, not toothed in front but furrowed (to receive upper teeth ? or horn like tubercles ?) Type Spec. at Cambridge, Mass. — *Cleveland shale*. *X.*

Titanichths clarkii, Newberry. Described and figured with *T. agassizii*. Two crania, &c. Found also by Dr. Clark, near Berea, O. in *Cleveland shale* (*Waverly*, *Pocono*). *X.*

Titanophasma fayoli. Brgt. The great dragon fly discovered by Mr. Fayol in his Commentry coal measures in France. Zittel's Handbuch, 1885, p. 757, fig. 937, *only one-fourth of the size of the original insect.* Given here to show what we may expect to find some day in our own *coal shales*.— *XIII.* NOTE. — Mr. Scudder has found one of the three species of this genus among Mr. Lacoe's collections at Pittston, Pa. See also a fine **Paolia vetusta,** Smith, from Indiana.

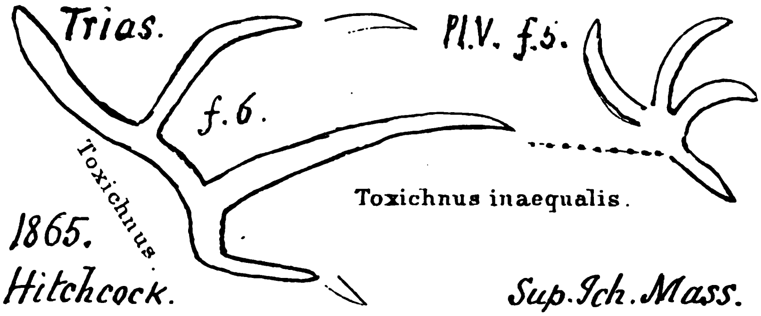


Titanophasma jocunda. Scudder. A dragon fly found in the shales under Campbell's Ledge, gap of the Susquehanna above Pittston, Luzerne Co. Lacoe's collection. Proc. Amer. Acad. A. & S. Boston, Vol. 20, 1885, p. 169. — Base of the *Pottsville conglomerate. XII.*

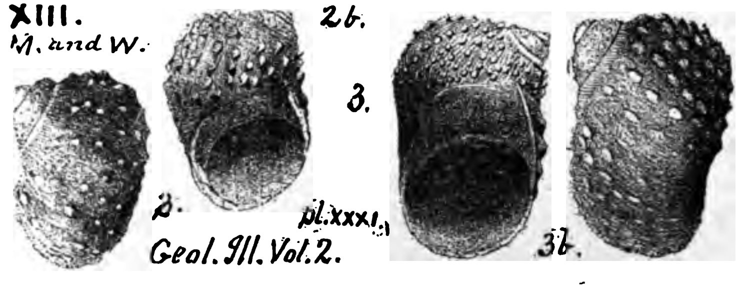
Tornoceras, Hyatt, is a *Devonian* genus of cephalopod shells, to which some of the *Goniatite* species have been transferred, such as *G. uniangularis*, Conrad. Its embryonic characters have been studied first in *T. retrorsum*, Von Buch, and best in *T. retrorsum* var. *typum*, Sandberger, 1880. Recently (Amer. Jour. Sci. Vol. XL, July, 1890, page 71, with plate 1), C. E. Beecher has studied the embryonic parts by breaking out well preserved nuclei from several hundred pyrite concretions presented by Dr. T. G. Lee to Yale Museum, collected at Wende station, Erie Co., N. Y., from *Hamilton shales. VIII c.*

Tornoceras (*Goniatites*) **uniungulare.** Conrad, Jour. Acad. N. S. Phila. Vol. 8, 1842. *Hamilton strata. VIII c.* — *For figure see Appendix.*

Toxichnus inæqualis, *tracks.* Hitchcock. Supplement to Ich. Mass. 1865, page 12, plate 5, fig. 5, *natural size*, outline of fore foot of one specimen; 6, of distorted hind foot of another specimen. The want of a heel is very curious. *Trias.*



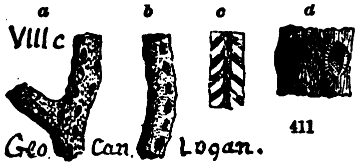
Trachydamia (*Naticopsis*) **nodosa.** Meek & Worthen,



Geol. Ill. Vol. 2, 1866, page 366, plate 31, fig. 2 *a*, *b*. (Proc. A. N. S. Phila. Oct. 1860.) Illinois *lower coal measures*. *XIII*.

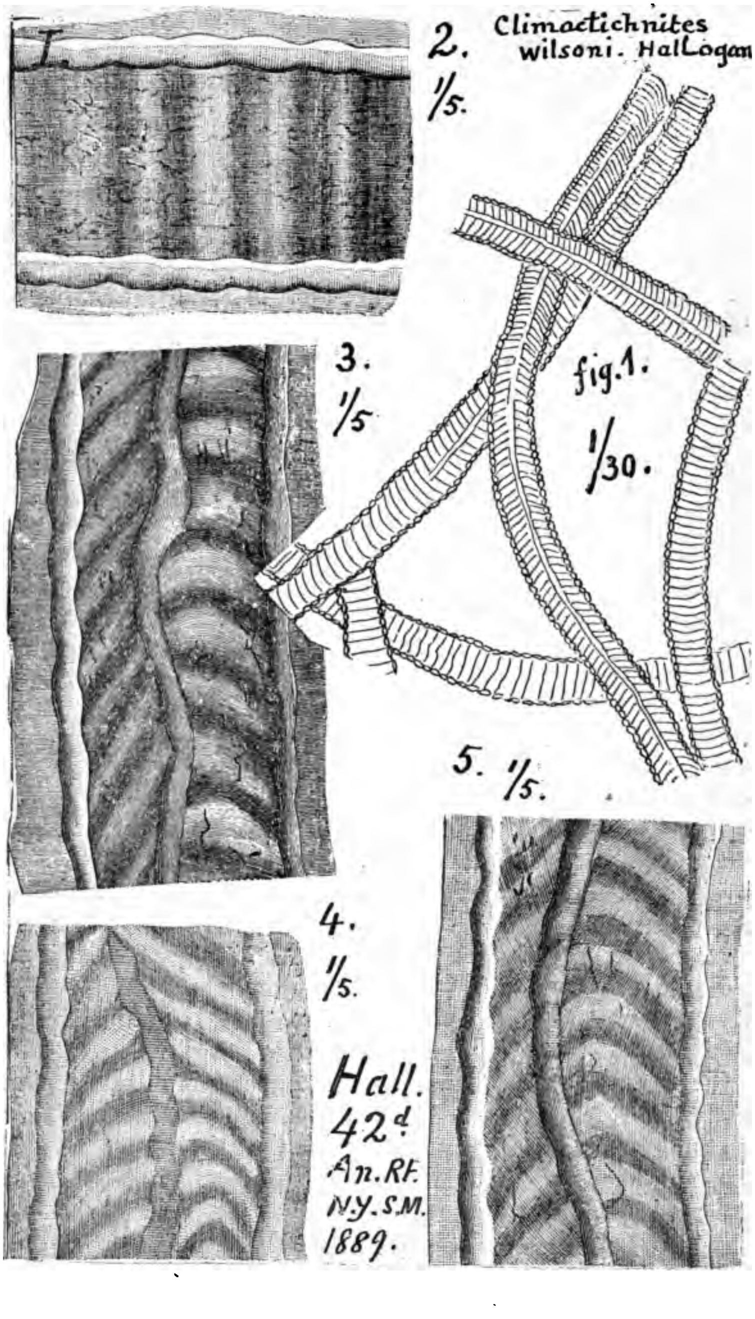
Trachydamia (*Naticopsis*) **nodosa** var. **hollidayi,** M. & N. fig. 3 *a*, *b*, with the preceding. *Illinois lower coal measures*. *XIII*.

Trachypora elegantula, Billings. Canadian Journal, 1859. Logan's Geology of Canada, 1863, page —, fig. 411 *a*, *b*, portions of two corallites; *c*, section lengthwise; *d*, *enlarged* portion of a corallite. *Hamilton formation*. *VIII c*.



Trachosteus clarkii, Newberry. Monograph 16, U. S. G. Survey, 1889, p. 167, plate 42, figs. 1, an armour-plate set with tubercles, *half nat. size*, 2, *nat. size*, eye orbit with ring, 4″ diam.; 3, right and left mandibles; 4, pre-maxillary? 5, maxillary? 6, stellate bases of tubercles; 7, tubercles, crowded, *enlarged*. Unique specimen; ornamentation peculiar; allied nearest to *Aspidichthys* of *Huron shale;* jaws about a foot long, set near the front end with sharp teeth ¾″ long. Spec. in Columbia College; found near Berea, O., in *Cleveland* (*Waverly*, *Pocono*) *shale*. *X*. *For figure see Appendix.*

Tracks and *foot prints* were found on slabs of *Potsdam sandstone* at Beauharnois in Canada by Logan and figured and described by Rich. Owen in the Q. J. Geol. Soc. London, Vol. 7, 1852, pages 247, 250, and afterwards by Logan in Vol. 8, 1853, p. 199, plate 6, a colored geographical map; plate 7, a plan of rock surfaces bearing ripple marks and tracks; plate 8, enlarged portions. (See figures of six species under **Protichnites,** on page 776 above). Owen withdrew his first supposition that they were made by some vertebrate animal (either batrachian or chelonian), and suggested that they might have been made by some crustacean like the living *Limulus*, or King-crab. Dawson after observing the movements of *Limulus polyphemus*, accepted this supposition as probable. (Can. Nat. Vol. 7, p. 71). — O. C. Marsh named, described and figured *Protichnites logananus* from the tracks on a *Potsdam sandstone* slab from Keeseville, N. Y., a much smaller species,

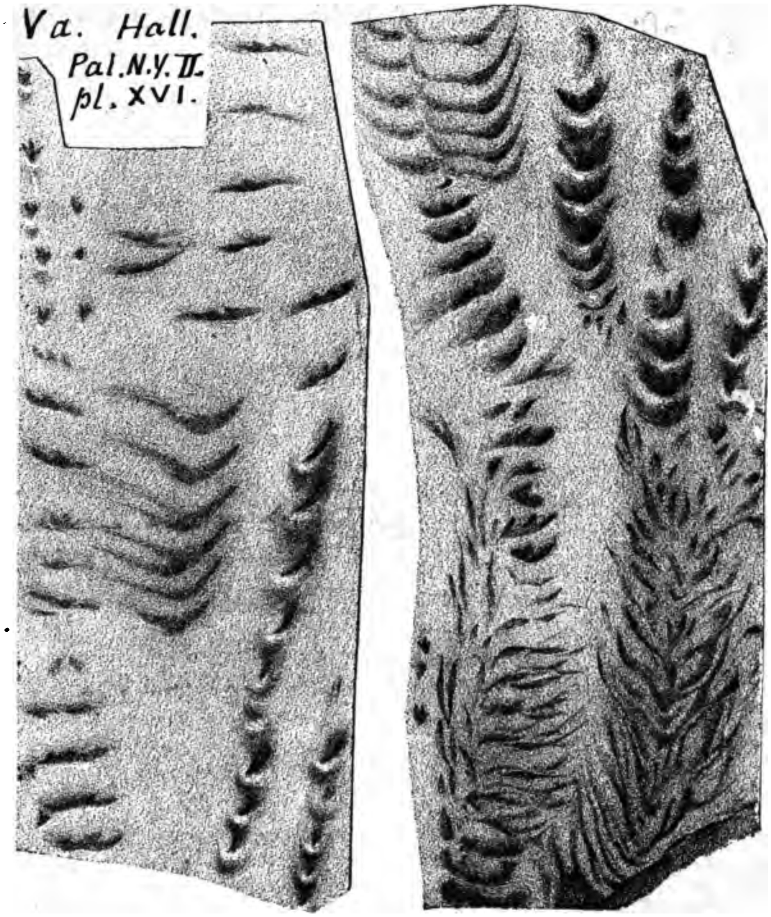


Climactichnites wilsoni. Hall Logan

Hall. 42d An. Rf. N.Y.S.M. 1889.

without a median groove. (Am. J. Sci. Vol. 48, 1869 Art. 5.) — Tracks of quite a different character were subsequently found and in company with the other kind, at Perth, in Canada. These were named and described by Logan in a paper which he read before the Nat. H. S. of Montreal in June, 1860 (reprinted by Hall, in the 42d Report on the N. Y. State Museum, 1888, pp. 30–34) as *Climactichnites wilsoni*, from the ladder-like aspect of the track and the name of its discoverer, Dr. James Wilson of Perth. — Tracks, similar to the Perth tracks, were discovered, in Oct., 1888, by Prof. W. H. Benedict, principal of the High School at Port Henry, N. Y., on *Potsdam* slabs in the street side walk, and afterwards in the quarry from which they were taken, They are now in the State Museum at Albany. Prof. Hall adds, that the animal seems to have had no free movable limbs, or otherwise very short ones, without the sharp appendages belonging to *Limulus;* and that the only reason for calling the tracks *crustacean* is our ignorance of the existence at that time of any larger creatures than *Trilobites*, and one *Limuloid* (42d Rt. p. 29). That this reason is a powerful one has been accentuated by the recent discovery on a *Potsdam sandstone* slab (now in the National Museum at at Washington) of some wonderful small three-toed foot-prints, not yet named or described by C. D. Walcott who has them in study.

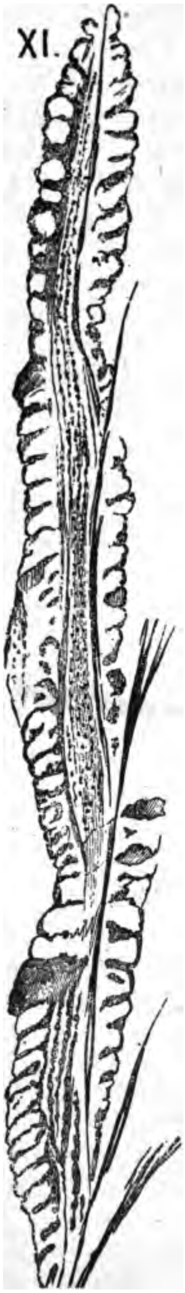
Tracks *of Crustaceans?* or *fish?* Hall, Pal. N. Y. Vol. 2, 1852, page 36, plate 16, fig. 1, 2, 3, 4, showing double ranges of tracks made by pointed, or forked claws, on the hard red mud of *Clinton age.* See other similar figs. on plate 15; and on plates 11, 12, 13, and 14, many others of an entirely different kind, more like worm tracks, but feathered, as if the animals had numerous hair like swimming appendages. Compare the *Nereites loomisi* and *gracilis* of Emmons; and the *Myrianites*, *Nemerites*, &c., found in Maine. Dana says that southern crustaceans do not make such marks. Agassiz suggested the horny hooks of cephalopods. Hall suggests the pectoral and anal fins of fish swimming in very shallow water. On plate 15 are some marks as if made with three and five toes or claws,

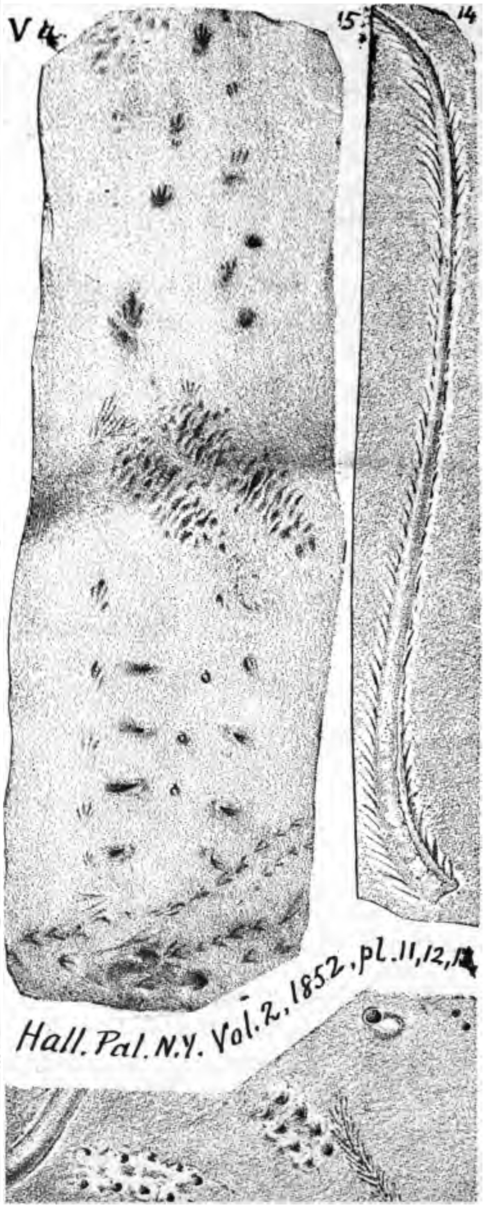


not pressed down upon the sand, but drawn back. leaving a little mound of sand. These tracks have been found most abundantly in the ravine below Tisdales' saw mill, Warren, Herkermer Co., N. Y.— *Clinton*, *Va.*

Tracks of five toed quadrupeds of the Coal measures in Westmoreland Co., Pa., by Dr. King, of Greensburgh, and described by him in Silliman's Journal, New Haven, Vol. 48, 1845, pp. 345, 346, under the name of **Sphæropezium** (the "round ball footed" animal), which see above.

Tracks of shell fish? Geol. Pa., f. 686. *XI.*





Hall. Pal. N.Y. Vol. 2, 1852, pl. 11, 12, 13.

Tracks of a reptile on *Mauch Chunk red shale* near Pottsville, Pa. See **Sauropus** *primævus*, *above.*

Track of a shell. — *Rusichnites* was considered to be a crustacean track by Dawson, who named the type (*R. acadicus*), and another species (*R. carbonarius*), both of Carboniferous age. Others related it to Hall's *Rusophycus*, a seaweed (fucoid) of Lower Silurian and Upper Silurian age. [Walcott showed me at the April meeting of the Academy (1890) a slab of sandstone, lately received into the National Musuem, on which was exhibited an impression of a *mollusk*, as large as a man's hand, at the end of a long line of Rusichnites. No track had previously been seen to come to an end. The question of what forms produced these tracks may now be considered settled. J. P. L.]

Tracks *of pupæ.* See **Haplotichnus** (in Appendix); **Plangtichnus**; and *figures* under **Treptichnus**; three new species named and figured by S. A. Miller in his N. Am. Geol. and Pal. 1890. *Subcarboniferous. XI.*

Tracks of *Grammichnus alpha*, Hitchcock. Supplement to Ich. Mass. page 19, plate 3, fig. 3, (cut in half, and doubled to get it across the page,) copied from the only good specimen in the Amherst Museum. This genus of "*Letter alpha track*," is different from the genus "Letter-foot" (*Grammepus crismatus*) of the Ichnology. (*Grammepus uniordinatus* is also a different genus from both. Hall.) The left leg of *Grammichnus alpha* shows as many as five protuberances; as many, less distinct, on the left leg, and on the "hyphens" (three marks between each pair of AA.) All this gives no clue to the nature of the animal that made these remarkable tracks; if indeed they be not vegetable impressions. (Hitch.) — *Trias.*

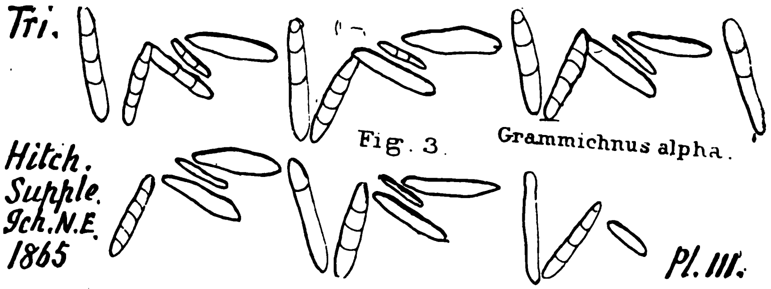


Fig. 3 Grammichnus alpha.

Tracks *of three-toed animals* in slabs of *Trias* (*Mesozoic*) red sandstone in York Co., Pa., found, figured and described by Mr. Atreus Wanner, Principal of York High School. First read before A. A. A. S. Cleveland meeting, 1888; then published in full in Annual Report Geol. Sur. Penna., 1887, (1889), page 21 to 35, plates 3 to 13.—*Trias.*

Tracks of animals in the New Red sandstone. Latest list of *genera* and *species* by C. H. Hitchcock, in Proc. B. S. N. H. Vol. 24, p. 118, Dec. 19, 1888.

MARSUPIAL. *Cunichnoides marsupialoideus*, Ed. Hitchcock. [NOTE. All not assigned to any author may be considered assigned to E. Hitchcock.]

BIRDS (thick-toed): *Brontozoum giganteum* (Charles H. Hitchcock), *approximatum*, (C. H. H.), *minusculum*, *divaricatum*, *tuberatum*, *exsertum*. *validum*, *sillimanium*; *Amblonyx giganteus* (?), *lyellianus*; *Grallator cursorius*, *parallelus*, *tenuis*, *gracilis* (C. H. H.), *cuneatus* (Barrett,) *formosus*, *Leptonyx lateralis*.

BIRDS (thin-toed)? *Argozoum redfieldianum* (?), *disparidigitatum*, *pari-digitatum*; *Platypterna deaniana*, *tenuis*, *delicatula*, *recta*, *varica*, *digitigrada; Ornithopus gallinaceus*, *gracilior; Tridentipes ingens*, *elegans*, *elegantior*, *insignis*, *uncus* (?); *Trihamus elegans*, *magnus* (C. H. H.)

DINOSAURS: *Anomoepus major*, *isodactylus* (C. H. H.), *intermedius*, *curvatus*, *minor*, *cuneatus* (C. H. H.), *minimus*, *gracillimus* (C. H. H.); *Gigantitherium caudatum*, *minus; Hyphepus fieldi*; *Corvipes lacertoideus; Tarsodactylus expansus* (C. H. H.), *caudatus; Apatichnus crassus* (C. H. H.), *holyokensis* (C. H. H.), *circumagens*, *bellus*; *Plesiornis quadrupes*, *pilutatus*, *æqualipes*, *mirabilis*, *giganteus* (C. H. H.), *new species* (C. H. H.), *Chimærichnus ingens* (C. H. H.), *barrattii; Anticheiopus hamatus*, *pilulatus*.

REPTILES and AMPHIBIA: *Polemarchus gigas; Plectropterna minitans*, *gracilis*, *angusta*, *lineans; Triænopus leptodactylus*; *Harpedactylus gracilis*, *gracilior*, *Crassus*, *new species* (C. H. H.); *Xiphopesa*, *triplex; Toxichnus inæqualis; Orthodactylus floriferus*, *introvergons*, *linearis; Antipus bifidus*, *flexiloquus; Stenodactylus curvatus*, *Arachnichnus dehiscens; Isocampe strata*, *Typopus abnormis*, *gracilis; Anis-*

ichnus (C. H. H.) *deweyanus*, *gracilis*, *gracilior; Comptichnus obesus*, *new species* (C. H. H.)

BATRACHIANS: *Otozoum moodii*, *caudatum* (C. H. H.), *parvum* (C. H. H.); *Batrachoides nidificans; Palamopsis clarki; Macropterna vulgaris*, *divaricans*, *gracilipes; Cheirotheroides pilulatus; Shepardia palmipes; Lagunculipes latus; Selenichnus falcatus*, *breviusculus; Exocampe arcta*, *ornata*, *minima.*

CHELONIANS: *Ancyropus heteroclitus; Chelonoides incedens; Helcura caudata*, *surgens*, *anguinea; Amblypus dextratus.*

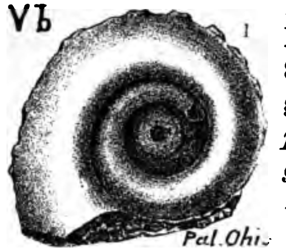
HEXAPOD ARTHROPODA: *Grammepes erismatus; Acanthichnus cursorius*, *alternans*, *alatus*, *anguineus*, *trilinearis*, *punctatus*, *rectilinearis*, *divaricatus*, *saltatorius; Bifurculipes curvatus*, *elachistotatus; Copeza triremis*, *propinquata*, *punctata*, *cruscularis; Hexapodichnus magnus*, *horrens; Conopsoides larvalis*, *curtus; Harpipes capillaris; Sagittarius alternans.*

Inferior ARTHROPODS, including larval forms and worms: *Harpagopus dubius; Stratipes latus; Hamipes didactylus; Saltator bipedatus*, *caudatus; Halysichnus laqueatus*, *tardigradus; Canicularius retrahens; Sphœripes larvalis*, *magnus; Lunula obscura*, *Pterichnus centipes; Unisulcus marshi*, *intermedius*, *minutus*, *magnus.*

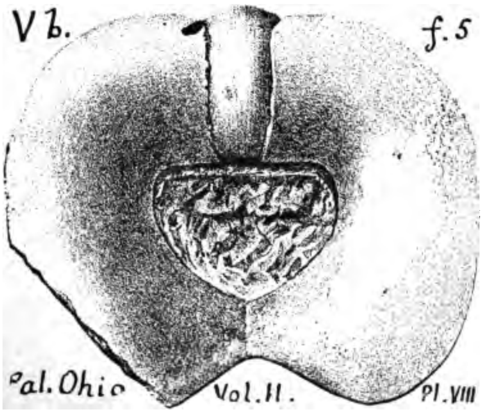
MOLLUSCA: *Bisulcus undulatus; Trisulcus laqueatus; Cochlea archimedea; Cochlichnus anguineus*, and two *new species.*

Uncertain: *Hoplichnus equus*, *poledrus; Ænigmichnus multiformis; Grammichnus alpha; Ampelichnus sulcatus; Climacodichnus corrugatus.*

"The Class of Birds is still retained for convenience, although the bones found in the west seem to point to reptiles as most probably the animals thus designated. It is still a fact that such special reptilian characteristics as would be exhibited in walking are absent in the genera Brontozoum and Grallator, while those creatures called Dinosaurs are thus referred, either because of the marks of front feet, heels to the hind feet or of tails. The bird group is also characterized by long legs, while most of the Dinosaurs had short legs, as indicated by their short steps. I do not change the reference of a group to Chelonians, though it is not satisfactory. — The *Arthropoda* are most likely to be referred to the lower classes; yet the presence of only six feet in the impressions leads us to speak of them as *Hexapods*. They may not be true insects, but larval forms requiring further investigation before satisfactory references can be made out. Further statement of the reasons for referring various imprints to their lowly owners would involve a discussion of the third part of the subject which cannot be undertaken now." C. H. H.

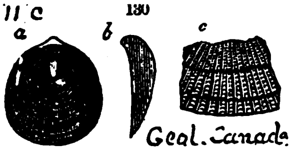


Tremanotus alpheus (**Bucania chicagoensis**, McChesney), Hall, 18th Reg. Rt. 1864, *Niagara*.—Pal. Ohio, Vol. 2, 1875, page 145, plate 8, fig. 1; the projections on the margin indicate the places of the *dorsal perforations, characteristic of the genus*. Genoa and Springfield, O. *Niagara limestone*. *V b.*



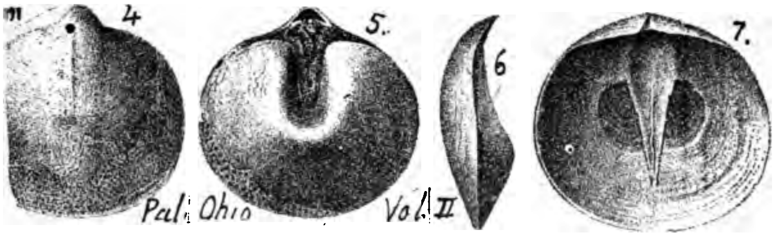
Tremanotus trigonostoma. (**Bucania trigonostoma**, Hall & Whitfield). — Pal, Ohio, Vol. 2, 1875, page 146, plate 8, fig. 5, view of a cast showing the mouth of the shell, and filling of outer whorl, showing the form of the expansion and section of the body whorl. Differs from Hall's ribbed *T. alpheus* in having a smooth surface, and a triangular aperture. Geneva, O. *Niagara limestone*. *V b.*

Trematis filosa. See **Schizocrania filosa**. *III a.*

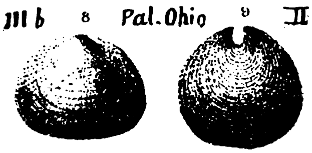


Trematis huronensis, Billings, Pal. Foss. Vol. 1, 1862.—Logan's Geology of Canada, 1863, page 159, fig. 130 *a*, lower valve; *b*, long section of both valves; *c*, *magnified* surface. *Black river formation*. *II c.*

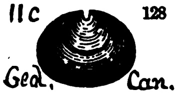
Trematis millepunctata, Hall, Pamphlet, *Cin. group*,



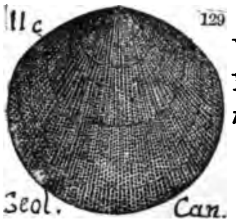
1866, Pal Ohio, Vol. 2, 1875, page 70, plate 1, fig. 4, *enlarged* dorsal valve of Ohio specimen, showing external punctæ around the margin; 5, ventral side, showing slit in hind margin; 6, profile; 7, interior of ventral valve (all *enlarged*). Surface strongly punctate in concentric curves, those near the margin going through the shell and marking casts of the interior; inner shell layers not punctured at all, which show the holes were made at the edge only of each layer of growth. Wrongly identified with Emmons' *Orbicula terminalis*. *III b*.



Trematis punctostriata, Hall 23d Regt. Rt. 1873, *Trenton and Hudson River*, Pal. Ohio, Vol. 2, 1875, page 70, plate 1, fig. 8, ventral valve showing punctate striæ over part of the surface; 9, another; the distant, radiating, indented striæ having each a row of distinctly pricked minute holes along the bottom; wholly confined to the surface, and disappearing (striæ and punctæ) when specimens are exfoliated. The original type specimens were from the *Hydraulic lime* of Clifton, Tennessee, supposed to be of *Trenton age*, *II c* — Cincinnati, O. *Hudson river age*, *III b*.

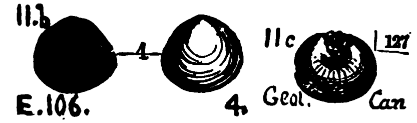


Trematis montrealensis, Billings. Pal. Foss. Vol. 1, 1862, Logan's Geol. Canada, 1863, page 159, fig. 128, from *Trenton limestone*, *II c*.



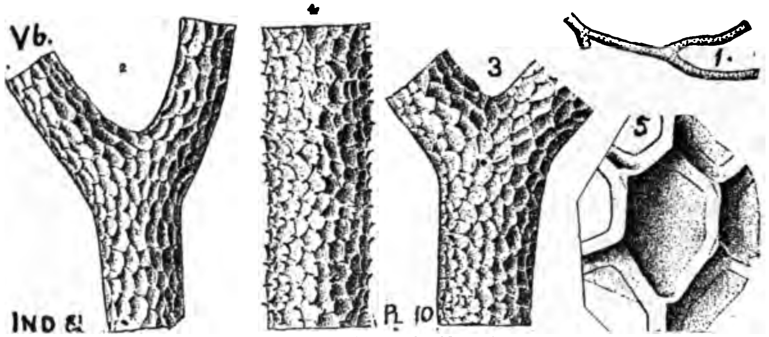
Trematis ottawensis, Billings, Pal. Foss. Vol. 1, 1862, Logan's Geology of Canada, 1862, page 159, fig. 129. *Trenton limestone formation*, *II c*.

Trematis terminalis. (*Orbicula terminalis*), Emmons, page 395, fig. 106, 4. *Trenton formation.* Logan's Geol. Canada, 1863, page — fig. 127. *II c.*

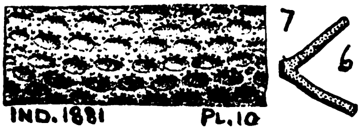


Trematopora aprinis.—In Bedford Co. Pa., Wolfsburg mines, in shale partings of *Clinton* fossil ore. (T2, 144.) *V a.*

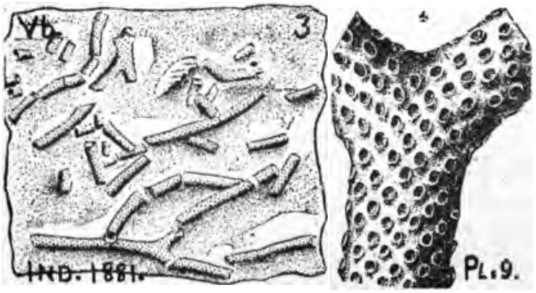
Trematopora echinata, Hall. Doc. ed, 28th, Rt. New York State Mus. 1876; Mus. ed. 1879; Collett's Indiana Rt. of 1881, page 233, plate 10, figs. 1 to 5, bryozoum solid, ramose; etc. Species very abundant, often nearly covering the calcareous slabs, and imbedded in the softer shales; form variable; prevailing form represented by fig. 4. *Niagara. V b.*



Trematopora granulifera, Hall, Pal. N. Y.. Vol. 2, p. 154, pl. 40 A, figs. 9a, 9c. 1852; 28th. mus. edit. p. 112, pl. 11, figs. 6, 7, 1879; Collett's Indiana Report, 1881, page 233, plate 10, figs. 6, 7. *Niagara. Vb.*

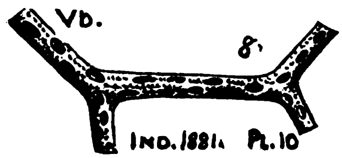


Trematopora infrequens, Hall. 28th Rept. N. Y. State Museum, Doc. Ed. 1876; Museum Ed. p. 111, 1879; also in Collett's Indiana Report of 1881, page 232, plate 9, figs. 3, 4; frond hollow, ramose; &c. It is distinguished

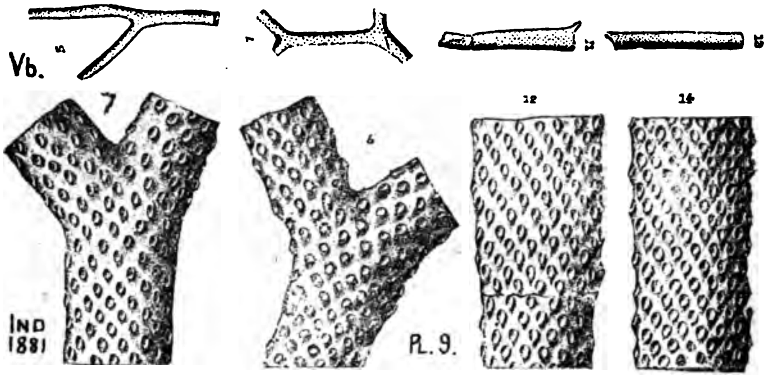


from *T. osculum* by larger cells, and cell margins strongly and equally raised all round. Ohio *Niagara formation.* *V b.*

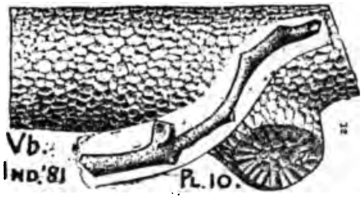
Trematopora minuta, Hall, 28th Report, 1876 and 1879; also in Collett's Indiana Rt. of 1881, page 234, plate 10, fig. 8; bryozoum very slender, &c. Differs from *T. macropora* by longer cell apertures and more prominent granular ridges. Ohio. *V b.*



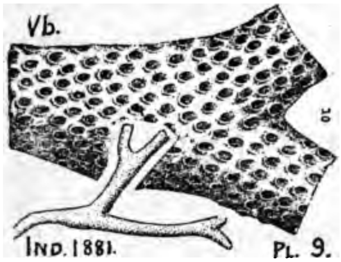
Trematopora osculum, Hall, 28th. Rt. N. Y. State Mus. 1876, 1879; (compare *T. ostiolata*, Hall. Pal. N. Y. Vol. I, p. 152;) also in Collett's Indiana Report of 1881, page 231, plate 9, figs. 5, 6, 7, 8, 11, 12, 13, 14; frond hollow, branching, &c; very abundant and most common species of the genus at Waldron, Ohio. *Niagara.* *V b.*



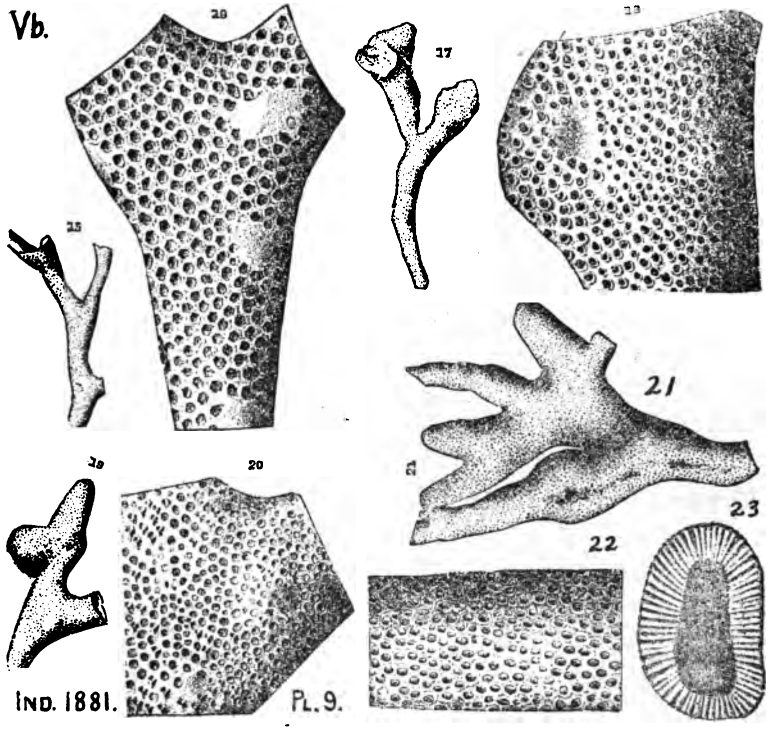
Trematopora spiculata, Hall, — (*T. spinulosa*, Hall. Doc. Ed. Rt. N. Y. State Museum, 1876;) Miller's cat. 1877; 28th Rept. N. Y. S. Mus. Ed. 1879; (not *T. spinulosa* of Hall's Pal. N. Y. Vol. 2, 1852, page 155;) also Hall, in Collett's Indiana Report of 1881, page 235, plate 10, figs. 11, 12; bryozoum solid, branching, &c., &c., readily distinguished by its solid aspect, variably minute cells, and stronger little spines disguising the cell apertures, giving a uniform rough surface; but when the edges of the cells are worn flat they look oval. Waldron, O. *Niagara.* *V b.*



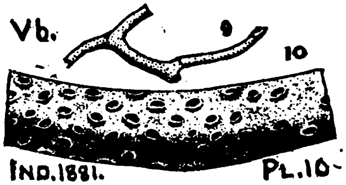
Trematopora subimbricata, Hall, Alb. Inst. 1879, Vol. X; and in Collett's Indiana Rept of 1881, page 234, plate 9, figs. 9, 10; bryozoum branching, straight, hollow, &c., &c.; looks like *T. osculum*, but has stronger branches, and irregularly placed cell-apertures, and without projecting edges on upper side. Waldron, O. *Niagara*. *V b.*


Vb.
IND. 1881.
PL. 9.

Trematopora varia, Hall, 28th Rept. N. Y., State Mus. Ed. 1876 and 1879; also in Collett's Indiana Report of 1881, page 232, plate 9, figs. 15 to 23; hollow, branching, &c., &c.; cell apertures round and oval on the same branch; but in worn specimens they look polygonal. Waldron, O. *Niagara*. *V b.*



Trematopora variolata, Hall, 18th Rt. N. Y. Mus. and in Collett's Indiana Rt. of 1881, page 234, plate 10, figs. 9, 10; easily distinguished from all the other species by its irregularly scattered cells and numerous spots (*maculæ*) with cells. Waldron, O. *Niagara. Vb.*



Trematopora——? Spec. 203–16 (fragments) found at Bellefonte, Centre Co. Pa., in *Trenton limestone. II c.*

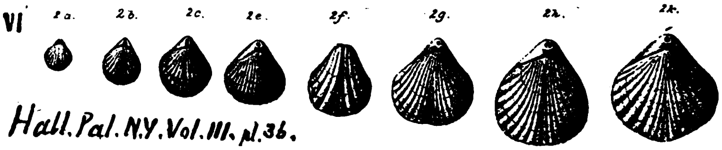
Trematopora——? Spec. 610 4, found by C. E. Billin, 1876, on Miller's farm, Warrior ridge, Barre township, Hunt. Co., Pa., in *Lower Helderberg limestone. VI.*

Trematospira acadiæ, Hall. Dawson's Acad. Geol. 1868, page 596, fig. 201; surface with fine concentric striæ. Arisaig, Nova Scotia. *V?* — In Bedford Co., Pa., in many places, multitudes of an *unnamed Trematospira* crowd the topmost (and only fossiliferous) bed of Stevenson's *Niagara formation.* (T2, 90.) *Vb.*

DAW. Fig. 201.

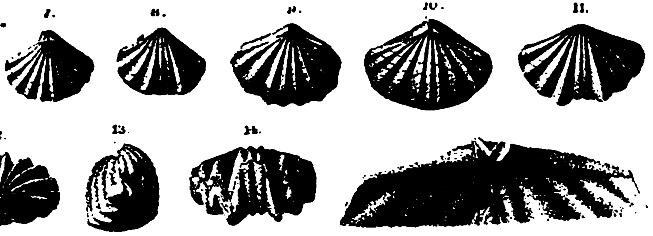
Trematospira costata. Hall. (For figure see under *T. perforata* below.) 10th Regents' Report, 1857. — Pal. N Y. Vol. 4, page 276, fig. 5, 6. *Lower Helderberg. VI.*

Trematospira formosa. (See **Rhinchospira formosa,** above. (Hall. Pal. N. Y. Vol 3, 1859, 1861, p. 215, pl. 36, figs. 2 *a* to *e*, young specimens, plications fine and equal, foramen extended below the beak and having a triangular form because of the absence of the deltidium (many young, however, have round foramen and a deltidium like the old); a specimen with angular striæ more like those of *T. globosa*, but with the long, narrow beak of *T. formosa ; g*, *h*, *k*, back, profile and front views of specimen of ordinary size (*l* to *t*, omitted, larger specimens). This is *Waldheimia formosa*, of Hall's Reg. Rt. of 1856; of the shaly limestone of the *Lower Helderberg* in Albany Co., N. Y. *VI.*



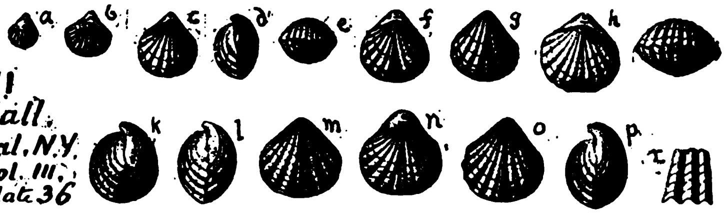
Hall. Pal. N.Y. Vol. III, pl. 36.

Trematospira gibbosa, Hall, (*Retzia eugenia*, Billings, which see above.) Pal. N. Y., Vol. 4, 1867, page 272, plate 45, fig, 7, 8, small dorsal and ventral; 9, medium dorsal; 10 to 14, dorsal, ventral, hinge, profile, and front views of a full grown specimen; 15 *enlarged* hinge, showing peculiar process and slender middle septum. Looks like a broad, fat *Rhynchonella*, but its perforated beak, false area, and punctate structure separate it from that genus. In N. Y., found in Ontario, Livingstone and Genesee Cos. in the *Hamilton*. *VIII c.*



VIII c.
Pal.N.Y.
IV, 45.

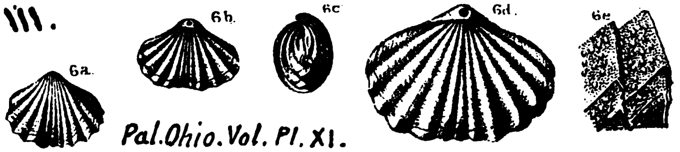
Trematospira globosa, Hall. (*Waldheimia globosa*, Hall, 9th Regent's Rt. 1856.) Pal. N. Y. Vol. 3, 1859, page 215, plate 36, figs 1 *a* to *e*, young shells, dorsal, profile and front views; *f* to *k*, larger ones; *l* to *p*, full grown ones showing differences; *r*, surface markings, plainer imbricating lamellæ, giving it a rude form and distinguishing it from *T. formosa*. *Shaly limestone* of *Lower Helderberg* in Albany Co., N. Y. — In Pennsylvania, collected by C. E. Hall and Hale (Spec. 601–19, -37, eleven specimens) at Orbisonia, Huntingdon Co.; also by Stevenson (T2, p. 155) at Bedford; also by Ewing (T4, p. 430) in Centre Co.; also Claypole, Spec. 11,815; all in *Lower Helderberg strata*. *VI.*



VI
Hall,
Pal. N.Y.
Vol. III,
Plate 36

Trematospira granulifera (*Retiza granulifera*, Meek, Proc. Acad. N. S. Phila. 1872, p. 318; compare *R. salteri*, Davidson, 1848). Pal. Ohio, Vol. 1, 1873, page 128, plate 11, figs. 6 *a*, *nat. size*, ventral; 6 *b*, dorsal; 6 *c*, profile; 6 *d*, *magnified* dorsal; 6 *e*, *more highly magnified* part of two folds

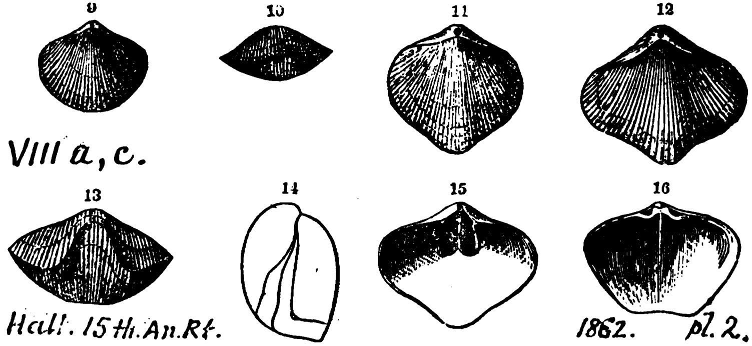
showing granulations, with many much smaller punctures. If *Trematospira* and *Retzia* be really different genera, this shell cannot be certainly placed under either name until its interior is known; but its specific alliance to *Trematospira gibbosa*, Hall, is very close; but it has two or three more plications, and five instead of three in the in the mesial fold of the dorsal valve. Even closer to *Retzia salteria*, Davidson, an English species. —Cincinnati. Base of *Hudson river formation. III b.*



III.

Pal.Ohio.Vol. Pl. XI.

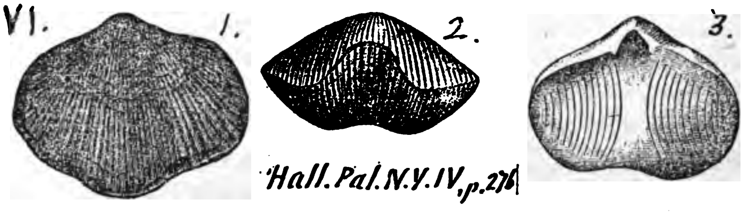
Trematospira hirsuta (*Atrypa hirsuta*), Hall, 14th An. Rt. 1861, p. 101; 15th An. Rt. 1862, plate 2, figs. 9 to 11, are figures of *Atrypa hirsuta* in the 10th An. Rt. page 128; figs. 12, 13, 14, back, front and profile of large individual with strong middle fold and groove; figs. 15, 16, ventral and dorsal interiors. — At Marshall's falls, Monroe Co., Pa., reported by Rogers, Geol. Pa. *Corniferous* and *Hamilton. VIII a, VIII c.*



VIII a, c.

Hall. 15th. An. Rt. 1862. pl. 2.

Trematospira multistriata, Hall, 10th Regent's Report,



VI.

Hall. Pal. N.Y. IV, p. 276

1857; Pal. N. Y. Vol. 4, 1867, page 276, figs. 1, 2, ventral and front views; 3, interior of ventral valve filled with stone and ground so as to show a section of the spires. *Lower Helderberg.* — Port Jervis, found by Dr. Barrett in White's *Stormville limestone* (G6, 134). *VI.*

Trematospira perforata, Hall, Pal. N. Y. Vol. 4, page 276,

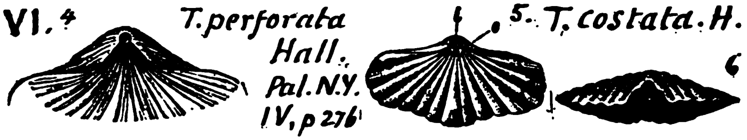
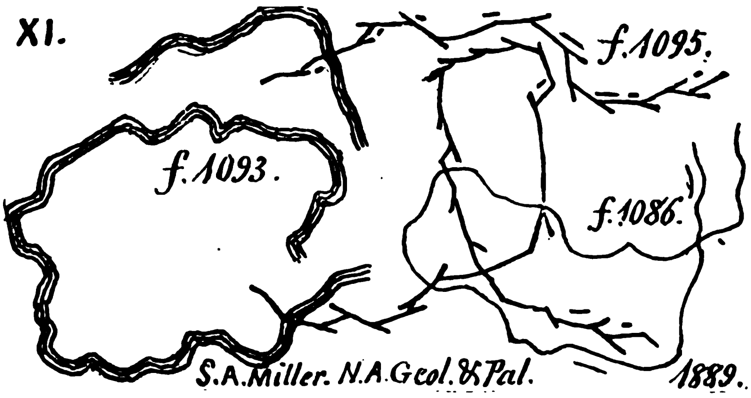


fig. 4, *enlarged* view of ventral beak, perforated, and triangular space under it.

Treptichnus bifurcus. S. A. Miller. North Am. Geology



and Pal. 1890, page 581, fig. 1095, a zigzag continuous trail, supposed to have been made by the larva or pupa of some Palæopterous insect. Whetstone quarries in Orange Co., Ind. Upper beds of *Kaskaskia* (*Subcarboniferous*) *formation. XI.* —To this I add Miller's figures of **Haplotichnus indianensis** and **Plangtichnus erraticus,** trails of larvæ of other kinds of insects living at the same time, found on the same whetstones. These creatures ran about over the shallow sandy bottom of the sea near shore, in inlets, or swampy places, and came on land only when the winged insect was prepared to escape from its chrysalis shell into the air. (S. A. M.)

Triænopus leptodactylus (*Sauroidichnites baileyi,* and *emmonsi*), *tracks.* Hitchcock. Ich. Mass. 1858, pages 111, 182, Treænopus leptodactylus.—*Continued.*

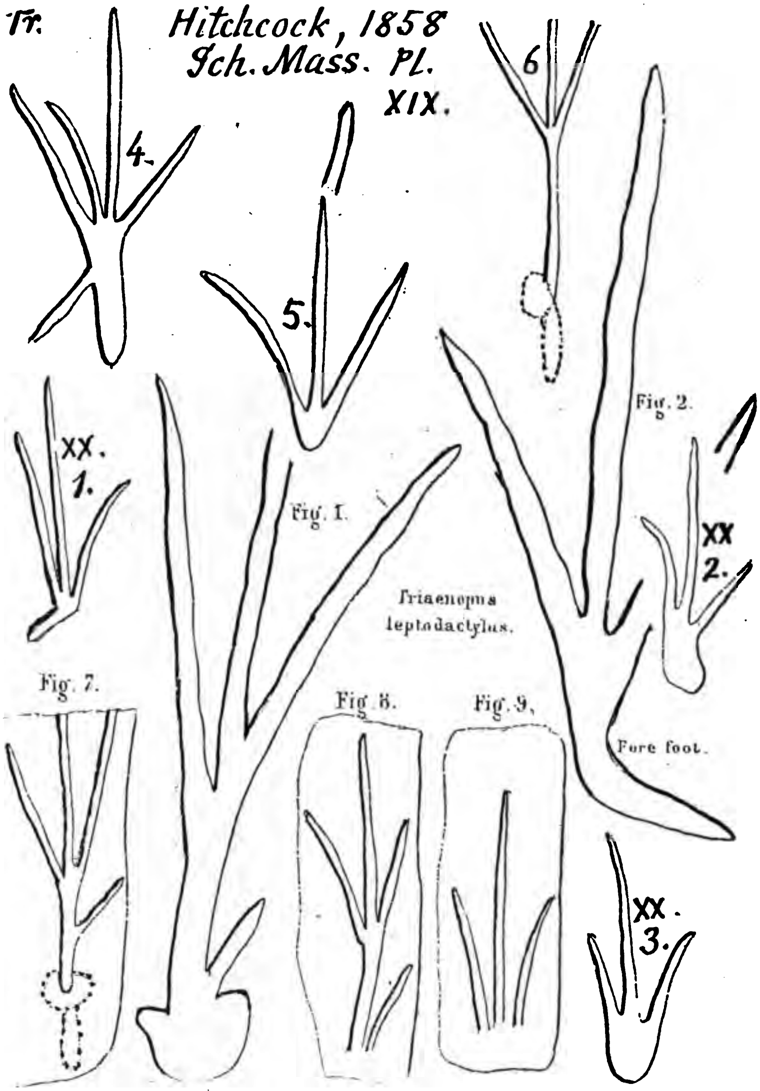
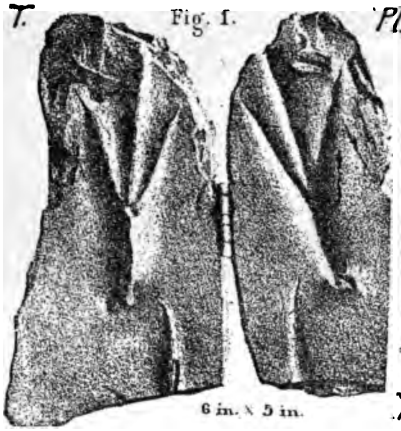
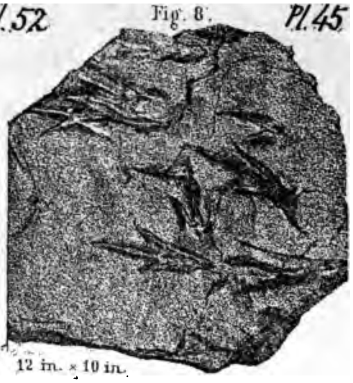


plate 19, figs. 1, 2, *natural size*, both feet; 3, 4, 5, 6, tracks on successive layers of red shale; plate 20, figs. 1, 2, 3; plate 45, f. 8, fine specimen from Weathersfield; plate 52, f. 1, exhibits the "stony volume," or rock leaves with the tracks pressed through from one end to the other. *Trias.*

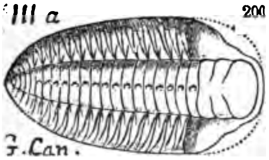
Triænopus leptodactylus.—*Continued.*

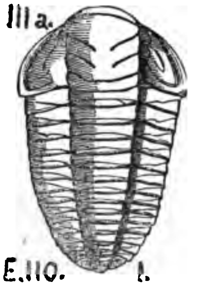


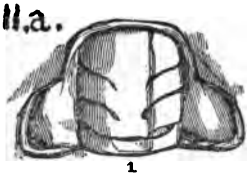


Hitchcock Ich. Mass. 1858.

Trianisites cliffordii. See **Favosites lycopodites.**

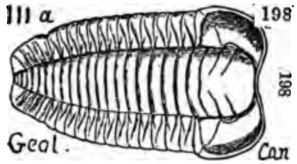




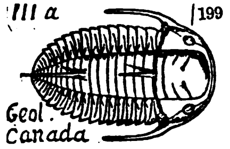


Triarthrus beckii, Green, Mon. Trilobites, 1832. *Trent.* and *Hud. Riv.* (*Calymene beckii*, Vanuxem, Geol. N. Y., 1842, fig. 8, 1; fig. 74, *Utica slate.*)—Emmons, Geology of N.Y., 1842, fig. 110, 1. — Rogers Geol. Pa., 1858, fig 613. — Logan Geol. Canada, 1863, fig. 200, *Utica* and *Hudson River.* [Note error on page 108 of this Dictionary where **Calymene beckii** is confused with the Cambrian *Ptychoparia trilineata* of Walcott, who says (MS. letter Dec. 21, 1888) that the latter is a *blind trilobite* and totally different from *Calymene* (*Triarthrus*) *beckii.*] — In Pennsylvania it is not uncommon in *Utica slate.* See forty-four spec. 301–1; forty-seven specs. 307–1; thirty five specs. 307–2; all collected by C. E. Hall and Fellows, at Bellefonte, Centre Co. *II c*, *III a.*

Triarthrus glaber, Billings. Canad. Naturalist and Geologist, Vol. 1, 1859. *Utica.* — Logan's Geology of Canada, 1863, page 202, fig. 198. *Utica slate. III a.*



Triarthrus spinosus, Billings, Canadian Report of Progress, 1857. *Trenton limestone. II c.* Logan's Geology of Canada, 1863, page 202 fig. 199. *Utica slate. III a.*

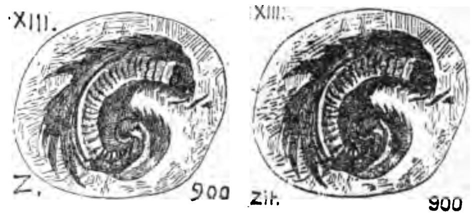


Triarthrus (*Atops*) *trilineatus.* See **Ptycoparia trilineata,** Walcott. *Cambrian.*

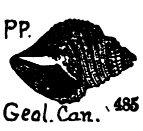
Triblidium. See **Tryblidium,** Lindström.

Trichiulus *ammonitiformis ; T. nodulosus ; T. villosus ;* all three Scudder's. Mem. Bost. S. N. H. Vol. 3, p. 291, 292, pl. 27, figs. 1, 2, 3, 4 ; and now after re examination by him rejected *as myriopods*, and accepted as *vegetable* fossils, (*nodulosus* doubtfully). (R. D. L.)

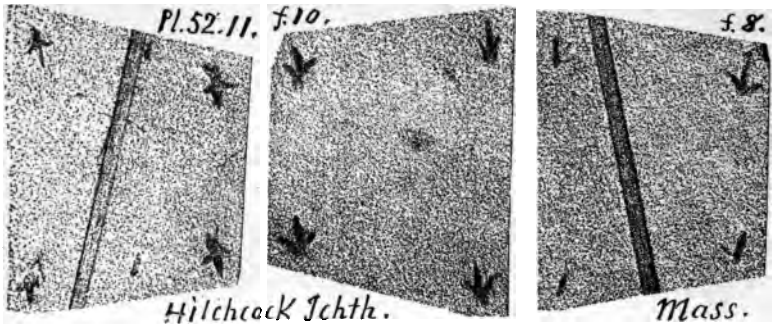
Trichiulus villosus. Scudder. A carboniferous myriopod insect? (plant?) from the Illinois coal measures on Mazon creek, showing the way in which the fossil animals and plants have been preserved in concretions, or balls, in the fine mud-rock. Zittel's Handbuch 1885, Vol. 2, p. 729, fig. 900, *enlarged 50 per cent.* — *XIII.*



Trichotropis borealis, Sowerby. Logan's Geology of Canada, 1863, page 964, fig. 485. One of the Arctic shells found in the glacial, or post glacial *Champlain clay* of Canada. *PP.*



Tricomanites adnascens. See **Rhacophyllum adnascens.** *XIII.*

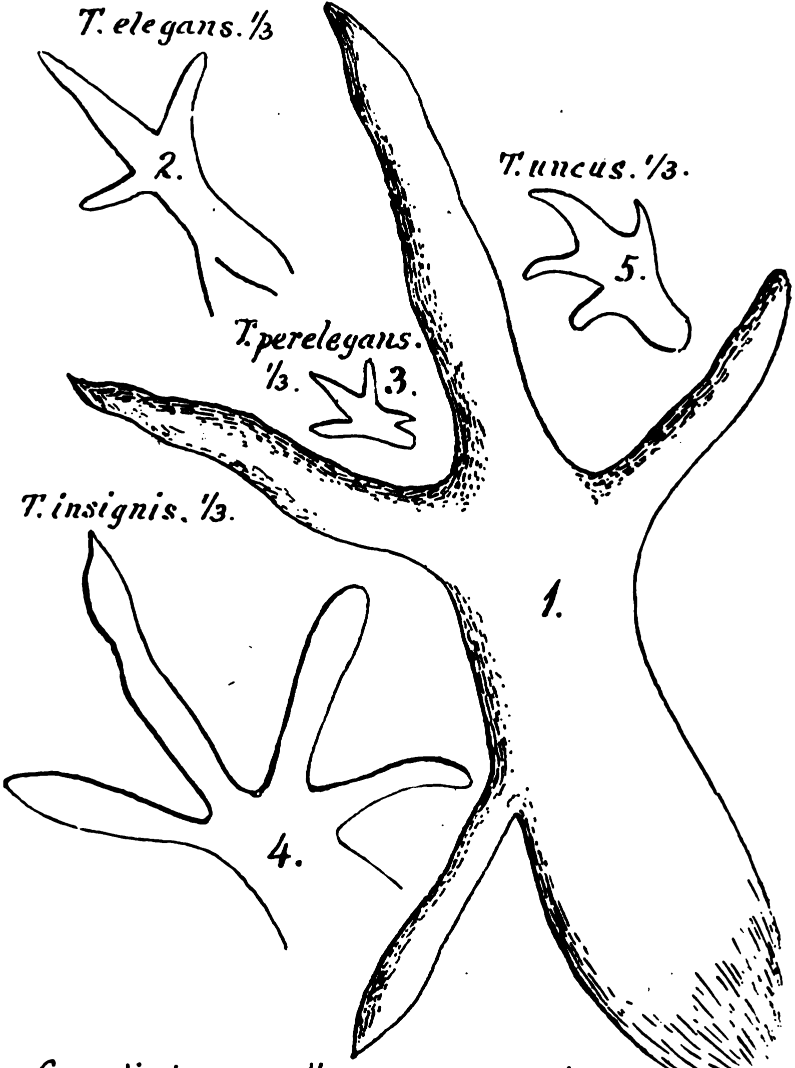


Tridentipes elegans. (*Steropezoum elegans; Ornithichnites diversus; Ornithoidichnites elegans,*) Hitchcock Ich. Mass, 1858, page 90, plate 15, fig. 2, *natural size*, (for which see on cut of *T. ingens*, below,); plate 45, fig. 6, a slab of red-sandstone in the museum at Amherst, Mass. 56″X28″ on which are four alternate right and left footsteps of *T. elegans*, and a multitude of smaller footsteps of *Apatichnus bellus;* plate 52, figs. 8, 9, 10, 11, of two slabs, on the upper and under sides of which are seen four footprints which have been pressed downwards through the layers of mud, now hard rock. I give the 1st, 3d and 4th, to show how differently the footprint looks as it is gradually lost in descending through the layers, until the limit of visible pressure is reached. — The New Red of the Connecticut river valley. *Trias.*

Tridentipes elegantior. See in **T. perelegans.**

Tridentipes ingens. Edw. Hitchcock. Ichnology of Mass. 1858, p. 89, pl. 15, fig. 1, *natural size.* (*Ornithichnites ingens*, Am. J. S. Vol. 29, p. 319; *Ornithoidichnites ingens*, Mass., Geol. Rt., plate 40, fig. 27; *Steropezoum ingens*, Fossil Footmarks of the U. S., Pl. 5, fig. 1.) The finest known footprints of this *Triassic narrow-toed bird-lizard* (?) are on a slab of sandstone from Whitehall, N. J., in Prof. Cook's collection of of New Jersey fossils at New Brunswick. (Prof. C. H. Hitchcock's MS letter Dec. 18, 1888.) This monstrous creature had three long slender toes pointing forward, a fourth pointing sidewise and backward, and a heel at least 7 inches long, making the foot print about two feet long, and the stride of the animal as it walked from 3½ to 6 feet. Its tracks were found in three localities in the Connecticut river valley. They will undoubtedly be found some day in Pennsylvania. — Other species and perhaps genera of these *three-toed* bird-lizards or lizard-birds,

Trias. Tridentipes ingens. E.H. 1/3 nat. size.



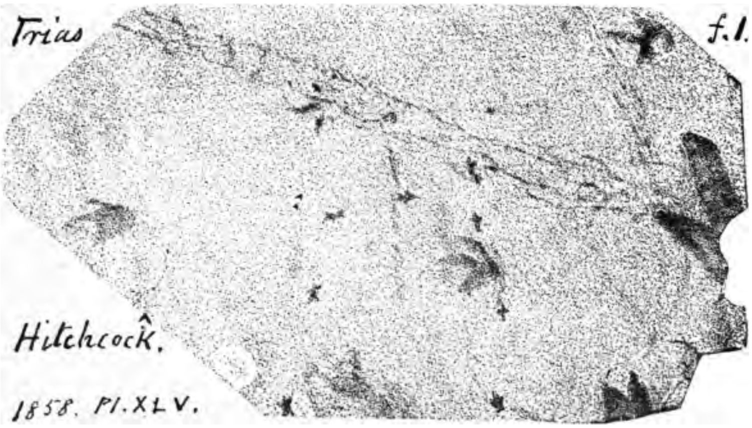
Connecticut river valley. Ich. Mass. Pl. 15.

have left their foot prints on the soft mud of the shores of the estuaries which ran up from the Atlantic into the new American continent after the emergence at the close of the coal age.

Four of these smaller species are shown in the cut: — Fig. 2, *Tridentipes elegans ; 3*, *T. perelegans ;* 4. *T. insignis ; 5*, *T. uncus ;* all figured and described by Hitchcock in Ichn. Mass., plate 15.—*Trias.*

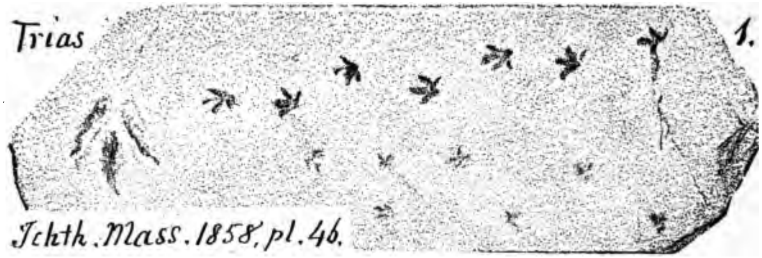
Tridentipes insignis, (*Ornithoidichnites divaricatus ; Ornithopus loripes,*) Edw. Hitchcock. Ichnology of Mass., 1858, page 91, plate 15, fig. 4, footprint outline *natural size* (given on cut of *T. ingens*, above,) ; plate 45, fig. 3, reduced slab with tracks; plate 47, fig. 2, ditto. Amherst museum, slabs from various quarries along the Connecticut river. *Trias.*

Tridentipes perelegans (*elegantior.*) Edw. Hitchcock, Ichnology, Mass., 1858, p. 90, plate 15, fig. 3, *natural* size of footprint. (given on cut of *T. ingens* above.) Also plate 45, fig. 1, showing a very unusual case of the animal turning short round and walking back. A similar instance of an insect, *Bifurculipes laqueatus*, walking in a circle, given on plate 30, f. 3, leads the good Doctor (on p. 173) into some curious reflections on the eternal records of the slightest actions of the will of animals and men. Pax theologico. The figure of the slab is greatly reduced from the size of the original in the Amherst museum. *Trias.*



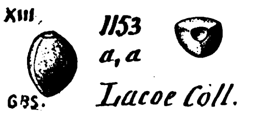
Tridentipes uncus, Ed. Hitchcock, Ichnology, Mass., 1858, page 91, plate 15, fig. 5, footprint *natural size* (given with *T. ingens* above); plate 46, fig. 1, greatly reduced from a slab 6 ft.

Figure of Tridentipes uncus, p. 1212.



4 in. long, from Turner's Falls of the Connecticut river. *Trias.*

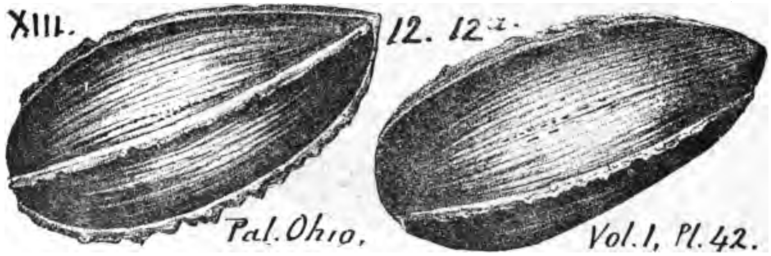
Trigonocarpon acuminatum, reported from the black slate at the base of Campbell's ledge, Pittston, Pa. (G7, 40.) — *XII.* — See specimen No. 1066 in Lacoe's cabinet at Pittston, Pa., from Stack Co., Illinois *coal measures. XIII?*



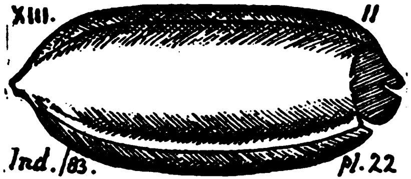
Trigonocarpon ambiguum. New species, Lesqx. MS. description of M. Lacoe's specimen No. 956, as follows: "Small, oblong, obtuse at both ends, alveolate at the base, short pointed by the union of the costæ at the apex. One specimen of this species was figured with *T. perpusillus*, Coal Flora, Pl. 110, fig. 58; but it differs from that species by its uniformly larger size and more abruptly rounded apex; figures *natural size. Coal measures ;* Ill. — *XIII.*

Tavellanum, Daws. For fig. see **T. intermedium.** *XIII*

Trigonocarpon bertholletiforme, Foster, Ann. of Science,


XIII.
12. 12 a.
Pal. Ohio, Vol. 1, Pl. 42.

Vol. 1, 1853. — Pal. Ohio, Vol. 1, 1873, page 369, plate 42, fig. 12, 12 *a*, copied from Foster's drawings, of a unique specimen, a nut different from all others known, of large size, with strong ridges running from base to summit. Zanesville, O., from upper part of *Lower coal measures. XIII.*

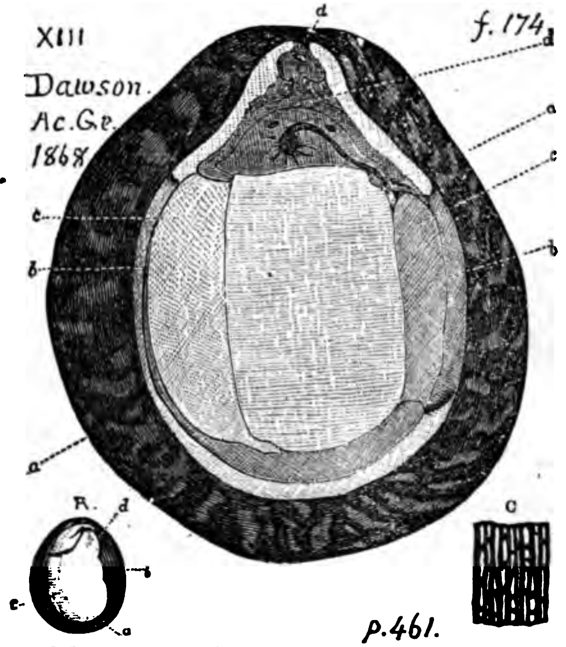


Trigonocarpon dawesii. L. & Hut. 3, pl. 221; Schimper. — (*Carpolithes disjunctus?* Lesq. Geol. Pa. 1858, plate 17, fig 11. Coal Flora of Pa., 1880, p. 586, plate 85, figs. 2, 3, 25; page 821, plate 111, figs. 4 to 6. Sharon coal? base of XII in Indiana; Kittanning slate under Darlington bed, (Q, 55,) Cannelton, Pa.) — Collett's Ind. Rt. 1883, plate 22, fig. 11. — *Coal measures. XIII.*

Trigonocarpon (*Steph.*) **dilatatum,** Lesqx. sp. inedit. Specimen No. 936 of Lacoe's cabinet at Pittston, Pa., from the *Kittanning coal* at Cannelton, Beaver Co, Pa., *XIII.*

Trigonocarpon fastigiatum, Lesqx. sp. inedit. Specimen No. 1067 of Lacoe's cabinet from Cannelton, Pa., *XIII.*

Trigonocarpon hookeri, Dawson. Acadian Geology, 1868, p. 461, fig. 174, A, enlarged to twice its natural size; B, a section of it greatly magnified to show *a*, the coat; *c*, the nucleus, *d*, the embryo; C, a bit of the inner skin still more highly magnified. —NOTE. On pages 462 to 472, Sir James W. Dawson gives a condensed treatise on the internal structure of coal, and a description of the vegetable tissues which he discovered in it under the microscrope. — *XIII.*



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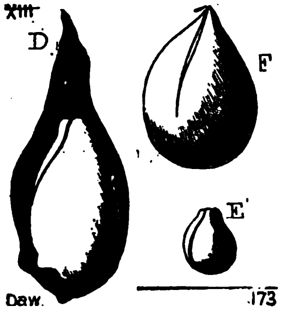
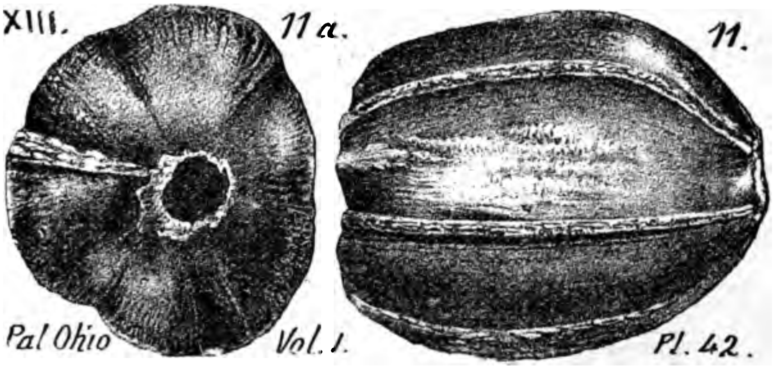
Trigonocarpon intermedium, Dawson. Acadian Geology 1868, page 460, fig. 173 D, a species of those nut-like fruits, often three or six-angled; with structure akin to pines and cycads; "I believe most of them to have belonged to **Sigillaria,** some possibly to conifers." (Dawson).—*T. noeggerathii* fig. F) and *T. avellanum* (fig. E), are two other species in the Nova Scotia *coal measures. XIII.*

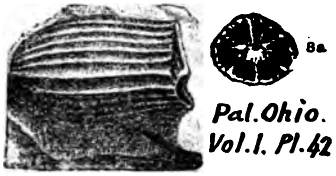


Trigonocarpon juglans. Lesq. Geol. Ill., Vol. 2, 1866, p. 460, pl. 46, f. 3.—Coal Flora, 1880, page 588, plate 85, fig. 4; large, nearly globular nut, with three ribs on a smooth surface, distantly and obscurely lined lengthwise. Murfreesboro', Ill.; Cuyahoga falls, O.; Campbell's ledge, Pa., (G7, 40.) — *XII.*

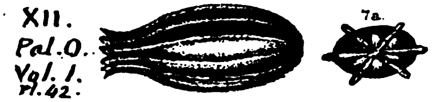
Trigonocarpon magnum, Newberry, Pal. Ohio, Vol. 1, 1873, page 369, plate 42, fig. 11; 11*a*. the basal end. — Coshocton, O. *Mahoning sandstone. XIII-XIV.*



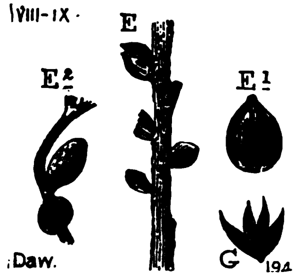
Trigonocarpon multicarinatum, Newberry, Pal. Ohio, Vol. 1, 1873, page 369, plate 42, fig. 8; 8*a*, its upper end; about 21 ridges, three more prominent than the rest, ending at the edge of a cup, which is thereby toothed all round. Cuyahoga falls, O. *Pottsville Cong. XII.*



Trigonocarpon noeggerathii, Dawson. For figure see under **T. intermedium.** — *XIII.*

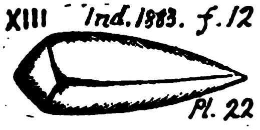


Trigonocarpon ornatum, Newb. Pal, Ohio, Vol. 1, 1873, page 368, plate 42, fig. 7; *7a* natural size; the nut and its basal end; six sharp and keel-like ridges, three alternate ones stronger, make a star-like cup on a flask-like nut. Cuyahoga falls, O. *Pottsville conglomerate. XII.*

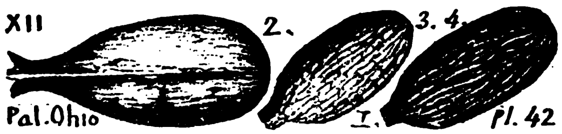


Trigonocarpon racemosum, Dawson. Acadian Geology, 1868, page 554, fig. 194 E. and E 1, E 2, *enlarged fruits;* borne on a stout rachis; sometimes close together, sometimes more distant; some of them with apparent traces of attached flower-leaves or bracts. St. John, N. B. *Upper Devonian shale. VIII-IX.*

Trigonocarpon retusum, quoted by White (G7, 40) as found by Lesquereux in Lacoe's collections from the *black slate* at or near the base of Campbell's ledge, Pittston, Pa. *Pottsville conglomerate*, *XII.*

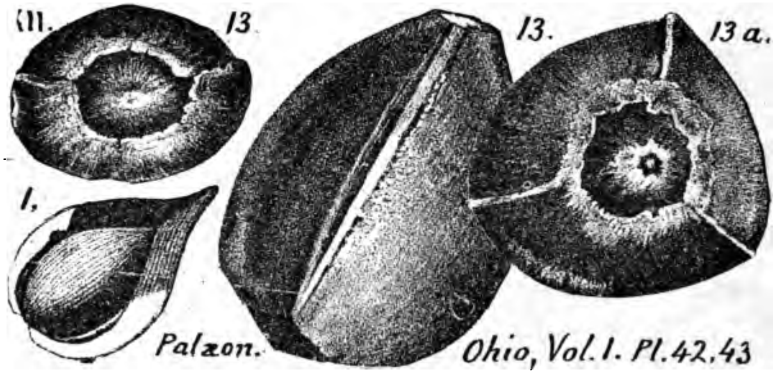


Trigonocarpon subcylindricum. (Lesq. Coal Flora, plate 85, figs. 9, 10. A mere variety perhaps of *Trig. parkinsoni*, Brgt. Lesq.) Collett's Indiana Report of 1883, page 105, plate 22, fig. 22. —Cannelton, Pa., in Beaver Co., Pa., under the Cannelton (Darlington, *Kittanning*) coal bed. *XII.*

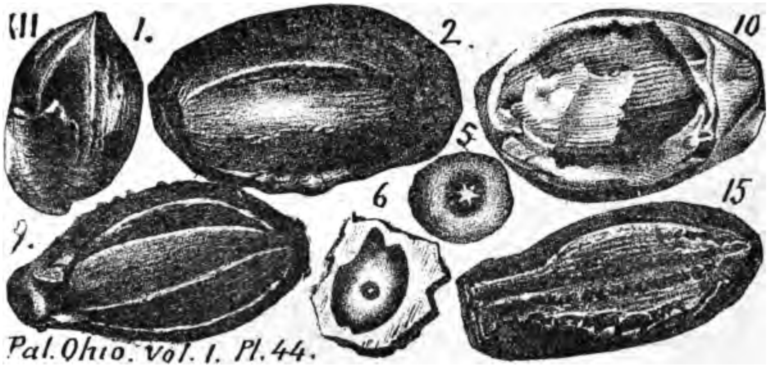


Trigonocarpon tricuspidatum, Newberry, Pal. Ohio, Vol. 1, 1873, page 368, plate 42, fig. 2, the complete nut without its shell; 3, 4, only the kernel; two different specimens; from Tallmadge, O. Roof of *Sharon coal bea* (Ohio No. 1,) near the base of the *Pottsville conglomerate.* (See also Q3, pages 53, 126, 160.) — *XII.*

Trigonocarpon triloculare, (*Carpolithes trilocularis*, Hildreth, Amer. Jour. Sci. Vol. 31, 1835, *Congt.* and *Lower Carbonif.*) Pal. Ohio, Vol. 1, 1873, page 367, plate 42, fig. 1, showing wings to the seed (nut), pl. 42, fig. 13, 13a, nut and base; plate 43, fig. 13, bottom of a compressed nut showing its kernel. — Specimens got at Cuyahoga falls, O., from *Conglomerate*; and at Tallmadge, O., from *Sharon coal* (*No. 1.*) roof, in the lower part of the *Conglomerate.* (See also Q2, 96.) *XII.* — It occurs also among Koch's collections at the Tipton coal mine, Blair Co., Pa. (Lacoe's MS. list, May 12, 1890,) in *No. X.*



Trigonocarpon; *group of seeds.* Newberry, Pal. Ohio,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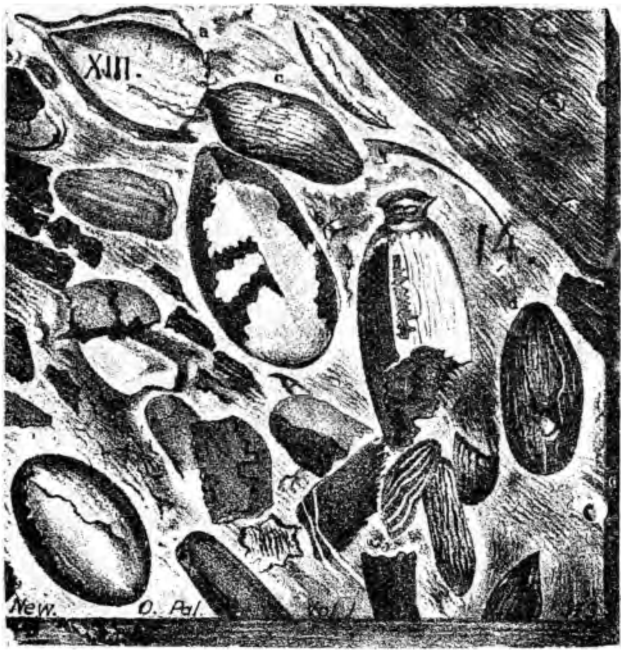
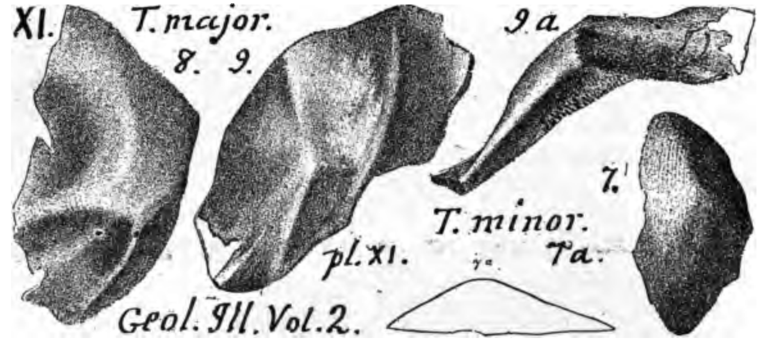
Pal. Ohio. Vol. I. Pl. 44.



Vol. 1, page 366, plate 42, fig. 5, part of the rind of a drupaceous fruit (flower end) which enclosed the nut or seed; 6, the same showing impression of stem; 9, nut enclosed in the fruit; 10, ditto.—Plate 43, fig. 14; group of fragments showing, *a*, *b*, segments of shell, *c*, *d*, nuclei of the fallen fruit; fig. 15, outline of fruit showing inclosed nut. Also, plate 44, fig. 1, showing part of the fleshy envelope; 2, entire fruit inclosing nut, (all *natural size*). Mostly from the roof shale of coal No. 1, Ohio (*Sharon coal*), in the lower part of the *Pottsville conglomerate*. *XII.*

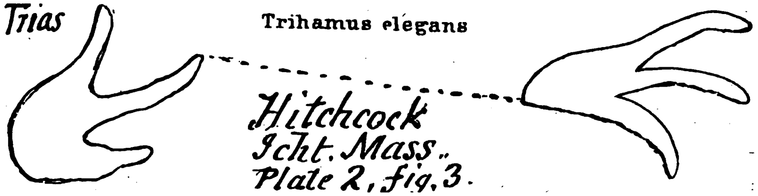
Trigonodus major. Newberry & Worthen, Geo. Sur. Ill., Vol. 2, 1866, page 112, plate 11, figs. 8, and 9, *natural size*, two opposite fish teeth, apparently from opposite sides of the same



jaw; 9*a*, profile from the angled side. Quincy, Ill. *Burlington (subcarb.) limestone. XI.*

Trigonodus minor, Newberry & Worthen, Geo. Sur. Ill., Vol. 2, 1866, page 112, plate 11, figs. 7, 7*a* (which see with *T. major* above), showing the upper surface and side view of smaller tooth from the *Keokuk limestone* (*Subcarb.*) at Nauvoo, Ill. — *XI.*

Trihamus elegans, *tracks.* Dr. E. Hitchcock. Supplement to Ich. of New England, 1865, page 9, plate 2, fig. 3, outline of the only good specimen at Amhurst College, from Turner's falls, *natural size ;* the three-toed foot suggests a bird ; but the large heel, the hooked shape of the toes, and the strong inward curvature of the foot favor a lizard type. *Trias.*



Trihamus elegans

Trilobites, in the *Basal series* of the *St. John group* (*Lower Cambrian*) in New Brunswick, beneath the rich *Paradoxides beds* (Walcott's *Middle Cambrian,*), are said to be so scarce that "only doubtful fragments have been met with." (Matthew, in Trans. R. S. Canada, 1889, page 159.) *Agraulos* and *Ellipsocephalus* are indicated; but no appearance of the abundant *Olenellus* fauna of Vermont and Canada.—The apparent total absence of trilobites from the rocks of southeastern Pennsylvania casts grave doubts upon their Cambrian age. In fact there is no note of any trilobites being found in any rock of the State below the horizon of the *Trenton limestone.*

In the *Trenton* they are abundant. See Report OOO, Cat. 1889, pages 176, *et seq.* — At REEDSVILLE, in Mifflin Co., just above the mill dam, specimens of *Homalonotus trentonensis*, Simpson, are recited under that head above. Other trilobites, mostly poor fragments, are 201–6, –9, –13, –14, –16, –18 (a very good tail), –19 (same species, fairly good), –20. Also, 204–21. Also, 205–2, *Bathyurus extans*, which see. — At BELLEFONTE, Centre Co. the *Trinucleus concentricus* is abundantly collected; for specimens see under that name below. Also

Asaphus obtusus was found in spec. 210–97*a*, –150. Also, *Illænus* (*sp ?*) 210–120. Also, *Calymene senaria* 210–67*a* (two), 210–135 (2, both poor), 210–141 (poor), 210–147 (with *Pholidops trentonensis*). — Also, *Ceraurus pleurexanthemus* (with *Tri. concentricus.*) — Also, *Calymene beckii*, 203–32. — At TYRONE FORGES, Blair Co., an *Asaphus*, 211–7; a *Ceraurus*, 211–7 (26); an *Illænus*, 211–8 (31); and many fragments and impressions of *Trinucleus concentricus* (see O3, p. 190.)

In the *Utica slate*, at BELLEFONTE, spec. 301–1, *Triarthrus beckii*, 44 individuals.—*See under that head above.*

In the *Hudson river slate*, at HENRIETTA FURNACE, Bedford Co. *Dalmanites limulurus*, 305–18 (a fair head.) Also, *Calymene* (*Triarthrus*) *Beckii*, 306–13. — At BELLEFONTE, 507–1, –2, were collected, 82 hand specimens, some of them slabs showing on their surfaces numerous fragments of *Calymene beckii;* most of them only heads; comparatively few bodies, and these nearly all crushed and distorted; tails rare.

In the *Clinton shale*, at McKeesville and Matilda furnace in Mifflin Co., at Orbisonia in Huntingdon Co., and at Bell's Mills in Blair Co., were collected specimems of *Dalmanitus limulurus*, as narrated on page 189 above; *Homalonotus delphinocephalus*, as narrated on page 288 above; an *Illænus*, Spec. 506–32; also a fragment, Spec. 501–17, 507–23, and a crushed impression, 507–1.

In *Lower Helderberg limestone*, at Bushkill in Pike Co. and in Perry Co., *Pleuropteryx*, as narrated on page 189 above.

In *Stormville slates.* (G6, 132.) *VI.*

In *Oriskany sandstone*, *Dalmanites micrurus*, at Orbisonia, Huntingdon Co., spec. 702–12.

In *Upper Helderberg* (*Marcellus ?* Clay.) *limestone*, *Proetus macrocephalus*, six specimens found in Perry Co. See 770.

At the base of the *Hamilton*, in Fishing creek section bed, Columbia Co., Pa. (G7, 219.) — No trilobites were seen by White in any of the Pike and Monroe Co. outcrops of the *Hamilton* sandstone (G6, 112). *VIII c.*

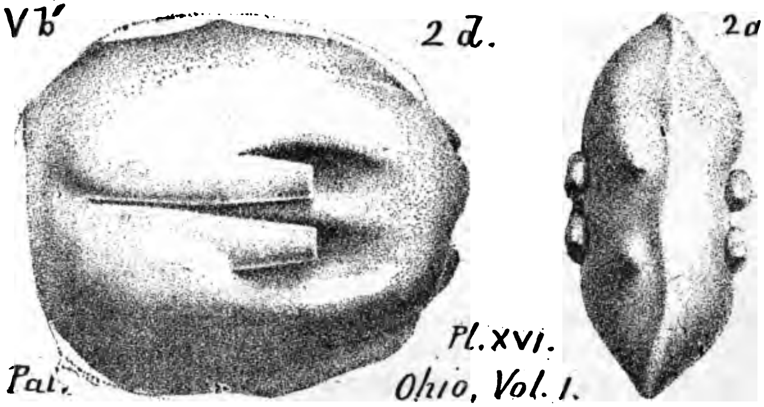
In *Hamilton shales*, *Dalmanites boothii*, a number found at Marshall falls, Pike Co., as narrated on page 187 above. — Also *Phacops rana*, at Marshall falls, Catawissa, Fishing creek, and Bloomsburg; numerous in Perry and Huntingdon Cos. Specimens narrated on page 631 above. — Also, *Proetus hal-*

demani, first discovered in Pennsylvania; spec. 12,407, Sherman's creek, Perry Co. — Also, *Proetus macrocephalus*, one specimen from Perry Co. See page 770 above. — Also, *Proetus rowi*, a rare New York species, but found in Pennsylvania, in Monroe Co. Spec. 804–77 (OOO, p. 214); 804–94 (possibly).— Also *Dalmanites calliteles*. numerously collected in Perry, Huntingdon, Columbia and Monroe counties, Pa., as narrated on page 188 above.—Also an obscure *Homalonotus*, at Dingman's falls, Pike Co. Spec. 808–27 (OOO, p. 219).

In *Chemung* rocks, trilobites more seldom appear. Predaceous fish having become abundant, trilobites were being rapidly destroyed. Not a single specimen is noted in the special list of C. E. Hall, from all the collections from this great formation made in various parts of the State (OOO, pages 220 to 251; *Ptychoparia* at the bottom of p. 243, being a misprint for *Ptychopteria.*)

In the *Coal measures*, *trilobites* make their last appearance, but have been seldom collected in Pennsylvania. Two tail pieces of *Phillipsia* (*Griffithoides?*) *sangamonensis* have been recognized by Heilprin among the *Mill creek limestone* fossils in the Wyoming anthracite collection at Wilkes-Barre. (See page 633 above.) —*Phillipria stevensoni* was found by Stevenson in the *Lower Carboniferous strata* in the gaps of Fayette and Westmoreland Cos. (K3, p. 311.) This genus is the last representative of the great family of Trilobites.

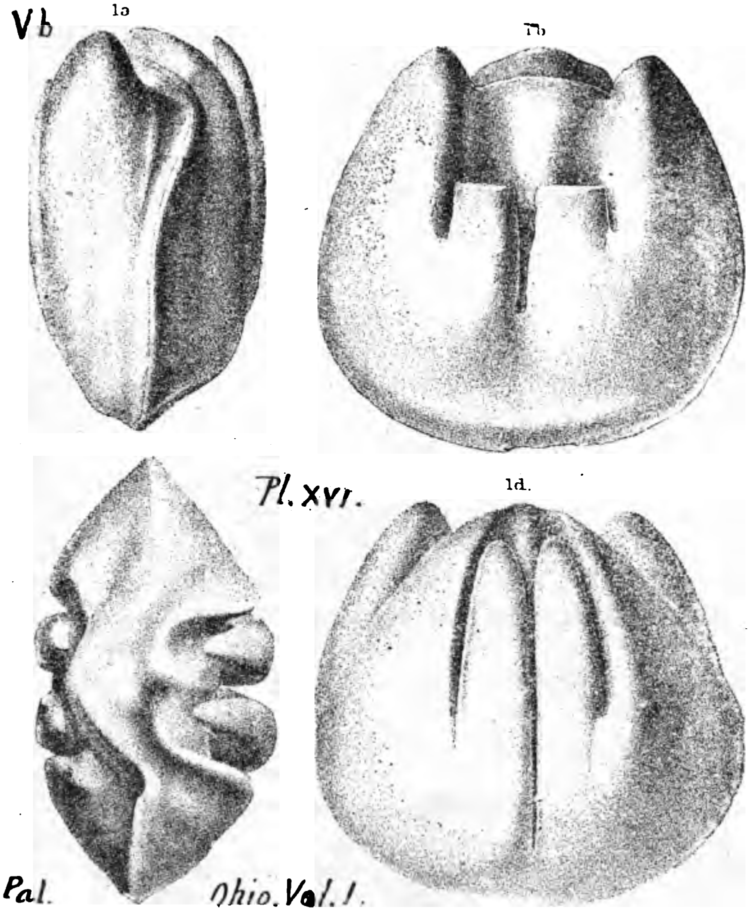
Trimerella grandis, Billings. Pal. Foss. Vol. 1862, *Guelph*



form.— Pal. Ohio, Vol. 1, 1873, page 182, plate 16, fig. 2 *a*, hind view of internal cast of type specimen in Mus. Canada Survey; 2 *d*, dorsal view of the same, (for comparison with 1 *d* of *T. ohioensis.*) Galt, Canada, and also in Ohio. *Guelph* (*Niagara upper*) *formation. V b'.*

Trimerella ohioensis, Meek, Amer. Jour. Sci. [2] Vol. 1, 1873, page 183, plate 16, fig. 1 *a*, *nat. size*, cast of interior, side; *b*, ventral; *c*, hind; *d*, back views. (See woodcuts in the text). Species more nearly related to Billings' *T. acuminata* than to his *T. grandis*. Genoa, Ottawa Co., O. *Niagara beds. V b.*

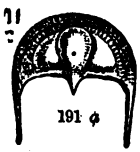
Vb

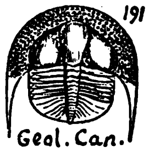


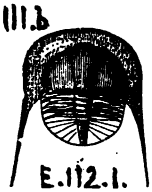
Pl. XVI.

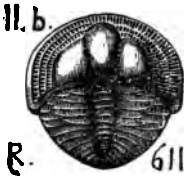
Pal. Ohio. Vol. I.

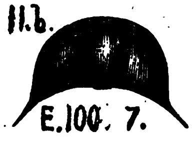
Trimerus. See **Homalonotus**.









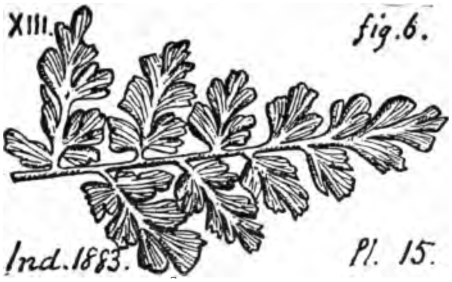


Trinucleus concentricus (*T. tessellatus*). Emmons' Rt. on the 2d Dist. of N. Y. 1842, page 390, fig. 100,7, and page 112, 1.—Rogers' Geol. Penna. 1858, p. 819, 820, fig. 611. Logan's Geol. Canada, 1863, p. 190, figs. 191 *a*, head showing the spine; *b*, complete specimen of the trilobite without spine. (*Nuttainia concentrica*, Eaton. Geol. Textbook, 1832.) — (*Crytolithes tessellatus*, Green. Monog. Trilobites, 1832.) — In Pennsylvania it has been collected as follows: Spec. 203–3 *a* (poor fragments), –11 (poor head), –13 (good half cheek), –17 (mostly impressions), –19 (not fit to draw), –23 (ditto), –24 (fragments, ditto), –25 (two half heads, one fairly good), –27 B (fairly good for representation), –40 (fragments of heads), all from Bellefonte. — Spec. 210–3 A (fairly good), –5 *a* (ditto), –10 (excellent example of *head* to represent species; another partly preserved), –12 (well preserved *head*, with other fragments), –13 (front of the head), –15 (head, pretty good), –18 (poor fragments), –19 (bit of head), –23 (fragments), –25 (*head* fairly shown), –31 (poor fragments), –32 (*head, very good*), –23 (*one good head* among other fragments, mostly heads), –34 (*one head very good*, among fragments), –36 (head fragments, fair), –40 (poor fragments), –41 (poor bits of heads), –46 *b* (fair bit of head), –51 (poor fragments), 210–53 *a* (*cephalic shield and spine*), –53 *b* (*spine*, fairly good), –54 (poor fragments), –59 *c* (ditto), –72 *e* (ditto), –78 *b* (ditto), –80 *b* (several fragments, some fairly good), –81, –84 *b* (poor fragments), –85 (ditto), –91 (fragments of heads, some fairly good), –96 (ditto, poor), –97 *b* (ditto), –100 (ditto, some good), –102 (many distinct examples, mingled with obscure fossils), –104 (mostly poor fragments), –108 (*one whole individual*, somewhat distorted, among fragments), –124 (poor fragments of head), –131 (ditto), –133 ten poor examples), –136 (ten ditto), –148 *b*, all the above two sets are in Hall's and Fellow's collections at Bellefonte, Centre Co., Pa., from *Trenton limestone beds*, *II c*. — Spec. 211–8 (ten poor examples) are in C. E. Hall's collections at Tyrone Forge bluff below wagon bridge over Little Juniata, from *Trenton*, *II c.* — Spec. 212-1 (fragm.), -3 (mostly impressions), -7 (poor heads), -8 (many fragments), are in Fellow's coll. at Nearhoff's quarry back of Tyrone forges, Huntingdon Co., Pa., from *Trenton limestone*, *II c.* — Centre Co. (T4, 424, 427). *II c*, *III a.*

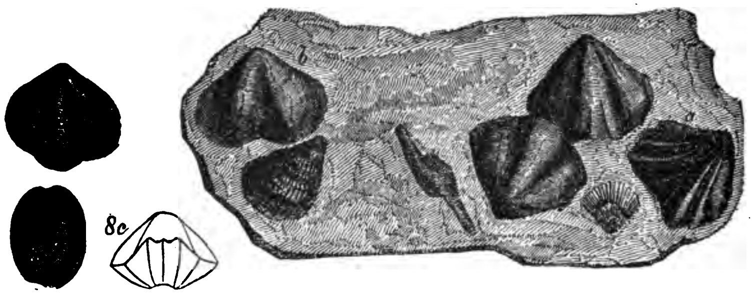
Trinucleus quadricostatus. **Microdiscus quad.** *III b.*

Trinucleus tessellatus. See **Trinucleus concentricus.** *II c.*

Triphyllopteris cheathami, new species. Collett's Report of Indiana, 1883, page 70, plate 15, fig. 6. IX. Subconglomerate coal measures. NOTE. — *Triphyllopteris lescuriana*, Meek, the only other species in Virginia at bottom of *subcarboniferous* (Collett). *X.*


XIII.
fig. 6.
Ind. 1883.
Pl. 15.

Triplesia ambigua. (*Atrypa ambigua*, Hall, Pal. N. Y., Vol. 1, 1847, page 143, plate 33, fig. 8*a*, *b*, usual simple trilobate form free from folds; *c*, front view in outline, showing two incipient plications in the sinus; fig. 9, four valves as they appear on a slab of lower *Trenton limestone;* in two (ventral and dorsal) shell free from plications either on mesial fold, or on the sides; dorsal valve marked *a*, however, has both sinus and sides plicated, while the ventral valve lying next to it is subtriplicate only in the sinus. The implicated form approaches *A. nucleus*, but is evidently different. Middleville N. Y. *II c.* — (*Camarella ambigua.*) — Recognized by C. E. Hall in the Pennsylvania Collections of 1876, *Trenton.* *II c.*

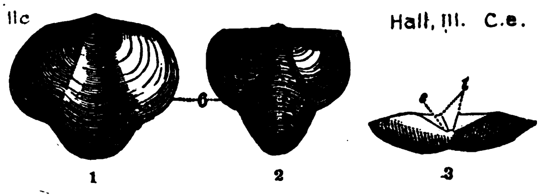


Triplesia lateralis. Whitfield. Bull. Amer. Mus. N. H. N. Y., Vol. 1, No. 8, 1886, page 303, figs. 9, 10, 11, dorsal and ventral valve, *nat. size.* "Appearance of very fine, hair-like striations on most of the specimens, like some internal feature of the fibrous structure, very plain on weathered or exfoliated specimens." Wider shell, with less marked and prominent mesial fold, than in any *Trenton species.* Quite numerons at Fort Cassin, Vt., in Gasteropod beds; but only as badly preserved separate valves. Not *Birdseye limestone*, as originally reported, but *Calciferous*, *Division D*, *upper part.* (Brainard and Seely, Bull. Geol. Soc. Am. Vol. 1, 1890, p. 505.) — *II a.*

Triplesia radiata. Whitfield. Bulletin Amer. Mus., N. Y., 1889, vol 2, No. 2, page 43, plate 7, figs. 5, 6, *enlarged* dorsal valves, figs. 7, 8, *enlarged* ventral valves. Mostly under ⅛ inch long; largest valves scarcely exceed ¼ inch wide. Looks much like a high-beaked, ventricose, deeply sulcated *Orthis ;* but is evidently a true *Triplesia.* No valves yet found in contact; but in one the area and deltoidal opening are seen; striæ usually dissolved away; found in hard subscrystalline limestone 8 or 10 feet beneath *Ophileta beds*, at Beekmantown, N. Y. *Calciferous sandstone formation.* *II a.*

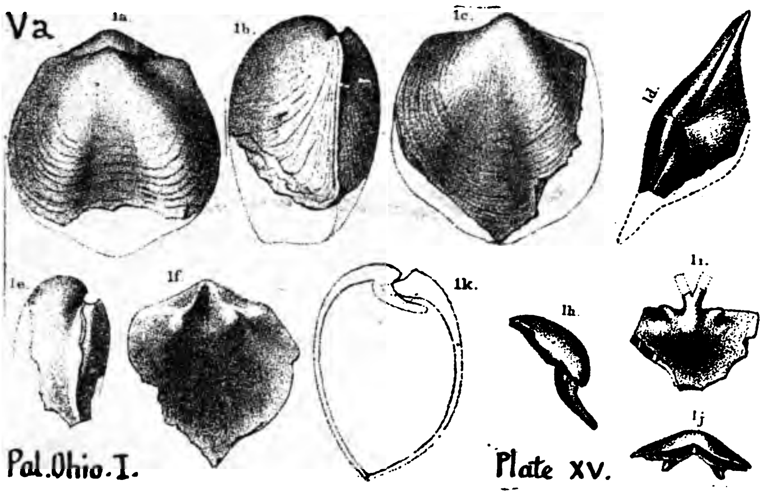
IIa
5
6
7
8
Whitfield. Bull. A. Mus. N. H. N. Y. II, pl. 7.

Triplesia extans. (now **Camarrella extans.**) Hall, Pal. N. Y., Vol. 3, 1859, page 523, woodcut, figs. 1, 2, 3; *Trenton.*—In Pennsylvania it has been collected by Billin, in Hunt. Co., Barre township, Millers' farm, Spec. 610–2 (eleven examples),–10 (poor fragments), in



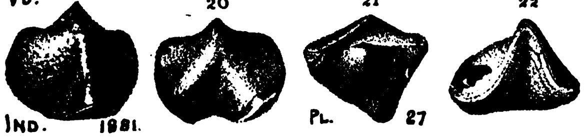
Lower Helderberg limestone. VI — In Tioga Co., at Mixtown, Spec. 856-1 (possibly *Althyris angelica*, like 855-39*a*, -43) was got by Claypole from *Upper Chemung*. *VIII q*.

Triplesia (*Camarella*) **ortoni**, *Dicraniscus ortoni*) Meek,



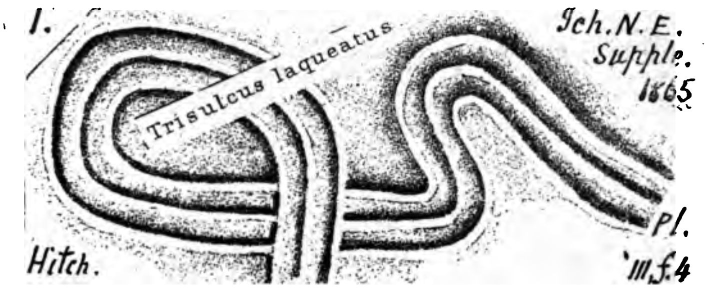
Amer. Jour. [3] Vol. 4, Pal. Ohio, Vol. 1, 1873, page 178, plate 15, fig. 1*a*, *b*, dorsal and lateral views of one broken specimen; *c*, *d*, dorsal and hinge views of another; *e*, side view of another; *f*, interior of broken ventral valve to show teeth, foramen, &c., *g*, fragment of dorsal valve turned up to show full length of bifid cardinal process; *h*, side view of same; *i*, inner view of same in another specimen, broken, and remains of brachial processes on each side; *j*, part of ventral valve, beak and most of the area, turned to show projection of hinge teeth beyond hinge line; *k*, ideal section. Perfect specimens hard to find; would probably most nearly resemble Hall's *Trenton* species. *T. cuspidata.* — Near Dayton, O. top beds of *Va*.

Triplesia putillus, Hall, in Colletts' Indiana report of 1881, page 298, plate 27, figs. 19—22. *Niag. Vb*.



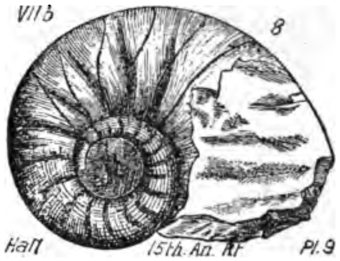
Tristychius fimbriatus, Stock. An. and Mag. N. H. Lond. (5) p. 177, pl. 7, found in Scotch *Carboniferous strata;* renamed by Tra'quair (A. & M. N. H. Lond. Dec., 1886) *Harpacanthus fimbriatus*. Found later, by W. McAdams in *St. Louis beds* near Alton, Ill. and figured and described by Newberry, in U. S. Geol. Sur. Monog. 16, 1889, page 203, plate 21, figs. 11, 11a, a small "sickle-shaped spine." — *XI.*

Trisulcus laqueatus, *worm track.* E. Hitchcock. Supplement to Ich. n. Eng, 1865. page 18, plate 3, fig. 4, which shows, imperfectly, the occasional protuberances on the three ridges, "like those of *Sphærapus*." Turner's falls, Mass. *Trias.*

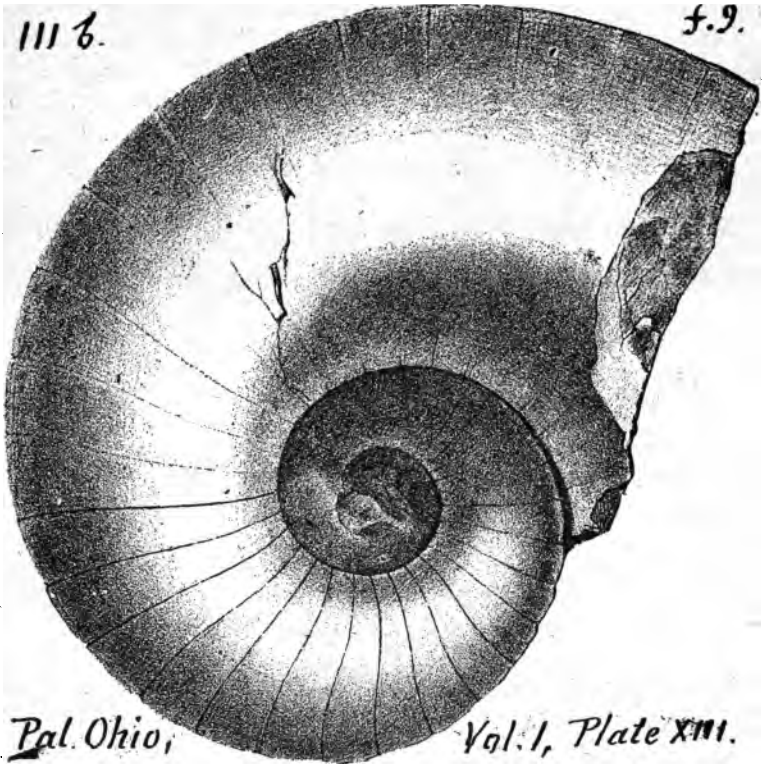


Trochoceras ? baeri, Meek and Worthen, Proc. Acad. Nat. Sci., Philada., 1865. Pal. Ohio, Vol. 1, 1873, page 157, plate 13, fig. 9, side view of Dr. Baer's imperfect specimen. Possibly a *Lituites* or *Nautilus*. The siphuncle in other specimens is more than its own width outside the center, and pierces the septa from without inward, as in *Nautilus*. (Compare *Lituites undatus*.) In Ind. and Ohio. *Hudson river upper beds. III b. See figure on page 1228.*

Trochoceras clio, Hall, 14th Annual Report, 1861, page 108. 15th An. Rt. 1862, plate 9, fig. 3. View of lower side of imperfect specimen. Found in *Schoharie grit. VII b.*



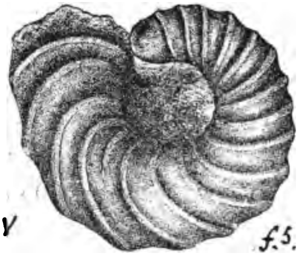
Trochoceras baeri. See page 1227.



III b.

f.9.

Pal. Ohio, Vol. I, Plate XIII.



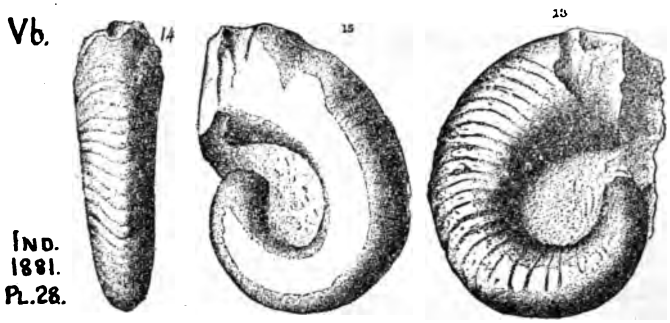
Vb'. Guelf Can Pal Foss. III, i, plate V

f.5.

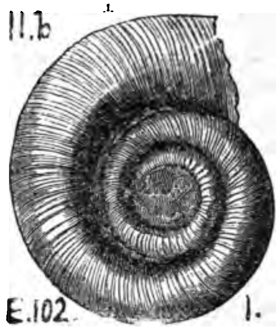
Trochoceras desplainense, McChesney (New Pal. Foss. 1859, pl. 5, f. 1). Canada Pal. Foss. III, i, 1884, page 36, plate 5, fig. 5, gutta-percha cast of a natural mold collected at Hospeler, Can. W. (See Hall's 20th Reg. Rt. p. 359, pl. 16, figs. 8, 9, 10.) *Gault* (*Upper Niagara*) *formation. Vb'.*

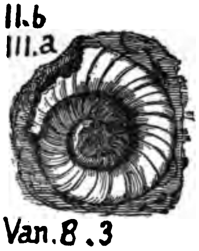
T. æneas, *barrandii*, *biton*, *costatum*, *discoideum*, *eugenium*, *expansum*, *gebhardi*, *incipiens*, *notum*, *obliquatum*, *orion*, *pandion*, *pandum* and *turbinatum* are other species mentioned in S. A. Miller's Catalogue N. A. Geol. and Pal. 1889.

Trochoceras waldronensis, Hall, in Collett's Indiana Report of 1881, page 326, plate 28, figs. 13 –15.



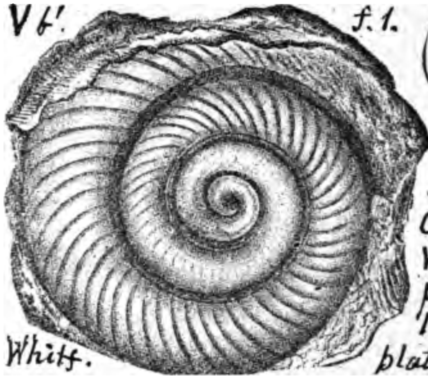
Trocholites ammonius. Conrad, Ann. Report, N. Y., 1838. — Vanuxem, Geology of Third District of New York, 1842, page 57, fig. 8, 3. — Emmons, 1842, page 279, fig. 74, 3, *Trenton;* and page 392, fig. 101, 1, *Hudson river.* — *II c, III a b.*





T. circularis, Miller and Dyer. 1878. *III b.*
T. minusculus, M. and D. 1878. *III a.*
T. planorbiformis, Con. 1842. *III a, b.*

Trocholites multicostatus, Whiteaves. (*Lituites multicostatus*, Whitfield.) Pal. Foss. Canada, 111, i, 1884, page 36, plate 6, fig. 1; gutta-percha impression of natural mold of exterior; 1*a*, a septum showing the position of siphuncle; Whitfield's specimen from Wisconsin *Niagara* rocks seem distorted or compressed



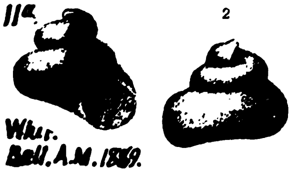
Pal. Foss. Canad. Vol. III, pt. 1, 1884, plate VI.

(Geol. Wisc. IV, 1882, pl. 20, f. 7); very near *T. ammonius*, Conrad. — Durham, C. W. *Guelph* (upper *Niagara*). *V b'*.

Trochonema beloitense, Whitfield, 1878. *II c.*

T. beachi, Whitfield, Geol. Wisc. Vol. 4, 1878. *II c.*

T. emaceratum., Hall & W. 1872. *VIII c.*



Trochonema exile, Whitfield. Bulletin of the Amer. Museum of Nat. Hist. N. Y. Vol. 2, No. 2, page 51, plate 9, figs. 1, 2, *enlarged*, two views of a unique perfect cast, among specimens from a dark crystalline limestone layer below the *Ophileta* bed at Beekmantown, N. Y. Type of *T. umbilicatum* but higher, etc. Near *T. beachi*, or *T. beloitense*, Whitf. from *Trenton limestone* (Geol. Wisconsin, Vol. 4, plate 6) but whorls slenderer. — *Calciferous sandstone formation. II a.*

T. fatua, Hall, 1867. *V b.*

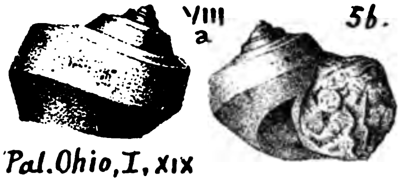
T. halii (*Pleurotomaria halii*). Hall, Wisc. *See* **T. pauper** *below. V b.*

Trochonema inornatum, Whiteaves, Pal. Foss. Canada, III, i, 1884, page 19, plate 3, fig. 7, the best of the specimens collected at Durham, C. W., but most of the shell (test) broken away from the umbilical region. *Guelph* (*upper Niagara*) *formation. V b'.*

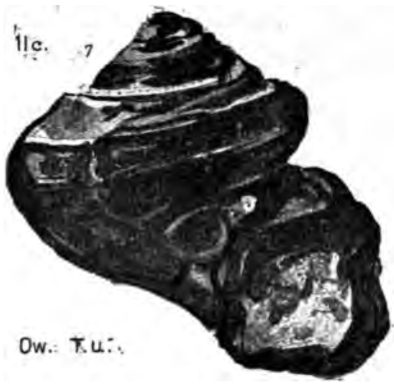
T. meekanum, (*T. tricarinatum*), S. A. M. 1889. See below.

Trochonoma pauper, var. **ohioensis** (*Pleurotomaria pauper*, Hall, 20th Regt. Rpt. 1867). Pal. Ohio, Vol. 2, 1875. page 143, plate 8, fig. 4, of a gutta-percha cast from the natural rock mold, an imperfect impression, which perhaps should be referred another species. Greenville, O. *Guelph* (*Niagara upper*) *formation. V b'.* — NOTE. S. A. Miller makes *T. pauper* a synonym for *T. halii.*

Trochonema tricarenatum, (S. Miller proposes instead of this preoccupied name, *T. meekanum.* N.A.G. and P. 1889, p. 428.) — Meek, Pro. Acad. Nat. Sci. Philada. 1871; Billings, Can. Nat. Vol. 4, 1859. — Pal. Ohio, Vol. 1, 1873, page 218, plate 19, fig. 5 *a*, *nat. size*, dorsal side view; *b*, opposite side, showing large umbilicus, etc. Readily distinguished from *T. umbilicatum*, Hall, which it resembles, by an unchanneled suture, etc., etc. Marblehead, O. *Corniferous limestone. VIII a.*

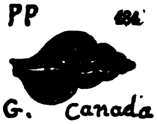


Trochonema umbilicatum. *Pleurotomaria umbilicata.* Owen). Hall, Pal. N. Y. Vol. 1, 1847, *Chazy up to Hudson river.*—Emmons, A. G. I, ii, 1855, 160, plate 5, figs. 4, *a*, *b* (also pl. 5, 9). Shell much depressed; 4 whorls; suture coniculated; mouth squarish; navel large; surface marked by wavy lines. — *Birdseye* and *Trenton limestones.*— Logan's Geol. Canada, 1803, figs. 92, and 172. *Trenton.*— Owen, Geol. Wisc., etc., 1852, pl. 2, fig. 7, refers it to the N. Y. species; and compares the European *Pleur. delphinuloides*, Goldf. At Prairie du Chien. — At Minneapolis a smaller and true *Pleu. umbilicata* is found in the same formation. Owen. — Canoe valley, Blair Co., Pa., reported by C. E. Hall, Proc. A. P. S. Phila. Jan. 1876.— *II b, c; III a, b.*



Trochonema occurs among the genera (Bull. Geol. Soc. Amer. Vol. 1, 1890, p. 505) at Fort Cassin, Vt., *Div. D* of the *Calciferous. II a.*

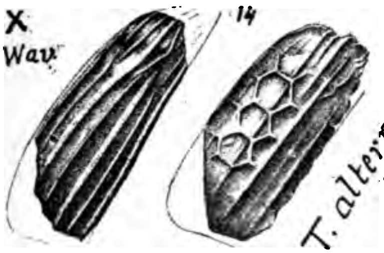
Trophon scalariforme, Gould. Logan's Geology of Canada, 1863, page 964, fig. 484. An Arctic shell found in the Canadian Glacial or Post Glacial *Champlain clay*. *PP*.



PP

G. Canada

Tropidocaris alternata, Beecher, Geol. Sur. Pa. Report P3, 1884, page 19, plate 2, figs. 7, 8. A *Eurypteroid* crustacean, found among many species of shells, in one of the *Waverly* (*Pocono*) beds of Division F, G, H, of Randall's section at Warren, Pa. — Figures taken from Hall's Pal. N. Y., Vol. VII, 1888, page 186, pl. 31, fig. 14, imperfect left valve of this bivalve crustacean, showing numerous keels (carinæ) and nodes in the cephalic region (head). 15, another ditto; carinæ and impressions of plates of same echinoderm; both from gutta-percha impressions of natural molds of dorsal surface. *X*.



X Wav

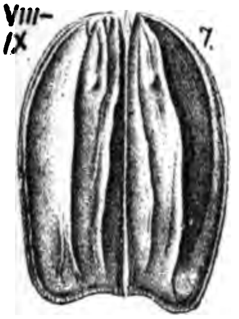
T. alternata. Beecher.

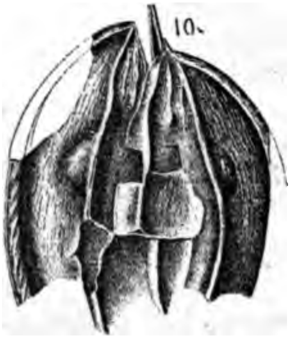
15 Tropidocaris interrupt VIII-IX

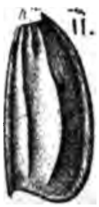
Hall, Pal. N.Y. Vol. VII, pl. XXXI.

Tropidocaris bicarinata, Beecher. Geol. Sur. Pa. Report

VIII-IX







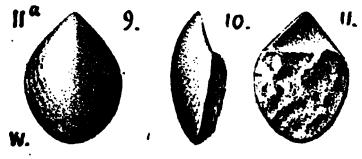
Beecher. Hall, Pal. N.Y. Vol. VII, 1888. p. 184, pl. XXXI.

P3, 1884, page 16, plate 2, figs. 3 to 5. Found in one of the beds of Randall's division R, Warren section. *Chemung upper? VIII g*, or *VIII–IX.* — Figures taken from Hall's Pal. N. Y., Vol. VII, 1888, page 184, plate 31, fig. 7, a shell (carapace) of this crustacean, with valves expanded, showing position of eye-nodes, surface sculpture, size and end of rostral plate; drawn from plaster cast of natural mold of dorsal surface, partly restored; 8, smaller carapace, valves crushed, one eye node, large lunate nodes on outer edge of principal keel; 9, front view of 7, *enlarged twice;* 10, front of 8, *enlarged twice;* 11, right valve of small individual, showing sharp hind end of hinge; 12, two segments of abdomen and piece of tail-spine (telson) *enlarged twice* to show surface marking. Warren, Pa. *VIII–IX.*

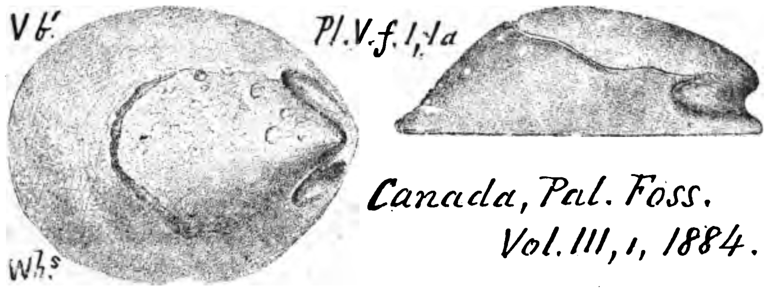
Tropidocaris interrupta, Beecher. (Figure under T. *alternata.*) Geol. Sur. Pa. Report P3, 1884, page 18, plate 2, fig. 6. Found at Warren, Pa., in a bed 300 feet above the level of the Allegheny river; *Chemung-Catskill formation. VIII IX.*

Tropidoleptus carinatus. (*Strophomena carinata*, Conrad, Ann. Rt. N. Y., 1839. *Hamilton.*) — Rogers, Geol. Pa. 1858, page 838, f. 672. — In Monroe Co., Pa. Marshall's falls (G6, 194, 271; spec. 801–6; 807–43, –44 (two, identified by J. Hall), –45, *Ham. sandstone.* — In Northumberland, abundant on Shamokin creek, Paxinos, Selinsgrove (G7, 354, 359; spec. 12,259, 12,300 (three). — In Columbia Co. at the top and bottom of *Ham. shales* (G7, 75, 79, 219, 229.) — In Perry Co. near Clarks mills (12,421, ten), on Crawley hill (12,464), and in Little mountain (12,707) all in *Ham. sandstone.* Also, at seven other places in the county (11,653, 11,769, fifty-one specimens; 12,016, nine; 12,238, 12,242, ten; 12,339 twelve; 12,497; 12,686, five; 12,835, 12,841; all in *Ham. upper shales.* — In Huntingdon Co. numerous in *Ham. lower, middle* and *upper shales* (T3, 171; 111, 261; 109). See from various parts of the county spec. 12,757, 12,760, 12,782, 12,864; 802–3. — In Blair Co., Bell's Mills, 805–28 (verified by J. H.) — In Centre Co. (T4, 433.) — In Bedford Co. in beds 48, 51, 58 of the Saxton section, *Ham. middle shales* and prevails throughout the *sandstone.* (T2, 82, 231, 232.) — [Spec. 12,738 (three) from Johnston's on James creek, Hunt. Co. is said to be from *Genesee, VIII e.*]—*VIII c.*

Tryblidium ? acutum, Whitfield. Bulletin of the Amer. Mus. N. Y., 1889, Vol. 2, No. 2, page 45, plate 7, figs. 9, 10, *enlarged* back and side views; fig. 11, the aperture, showing the flattening of the under side of the apex. Substance of shell very thin; surface unknown, as all specimens have lost the shell, but show obscure traces of lines of growth. In crystalline limestone, 4 to 6 feet beneath the lower *Ophileta beds* in *Calciferous sandstone formation. II a.*

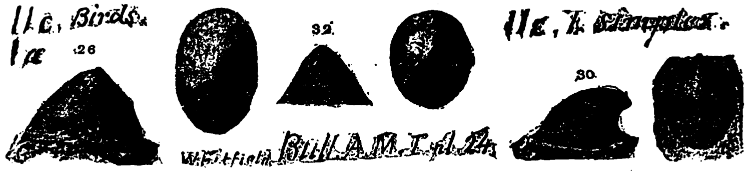


Tryblidium canadense, Whiteaves. Pal. Foss. Can. III, i, 1884, page 31, plate 5, fig. 1, a unique perfect cast of interior seen from above; 1*a*, side view of same; found at Hospeler, C. W., in *Guelph* (*upper Niagara*) *limestone. Vb'.*



Canada, Pal. Foss. Vol. III, 1, 1884.

Tryblidium conicum, Whitfield. Bull. Amer. Mus. Nat. Hist. N. Y. Vol. 1, No. 8, 1886, page 306, plate 24, figs. 26, 27, side and top views of a small shell; 32, 33 of a still smaller one. Has nearly the characters of Lindstrom's Swedish Silurian gastropod genus *Tryblidium*, with muscular scars arranged in six disconnected pairs, but showing *more* than six, and having a nearly straight basal margin; and one specimen being almost symmetrically conical instead of having its apex overhanging one end of the oval shell; also, scars continuous under the apex as in *Natella*



pellucida, and *N. cymbularia*. "Were it not for the separate and detached muscular scars there would be no valid reason for separating these shells from the living *Nacellas* except their Palæozoic age." (W.) This species is quite small and might be the young of the other species; but its largest specimens (½ inch long) have the apex higher, and the back very much more bowed, than adults of other species. Was apparently parasitic, or at least sedentary (like the common *Crepidulas*), for it is found attached to other shells; in one case, several on a fragment of *Orthoceras brainerdi*. In Canada in *Calc. Sand.* At Fort Cassin, Vt., in *Division D*, (Brainard and Seely, Bull. G. S. of Am. Vol. 1, 1890, p. 505.) *II a.*

T. erato (*Metopioma erato*, Bill.). *II c.*

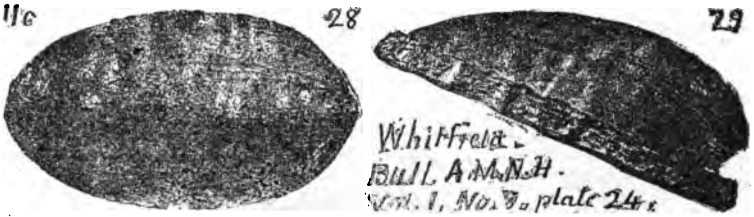
T. eubule (*M. eubule*, Bill.) *Black Riv. II c.*

T. hyrie (*M. hyrie*, Bill.) Pal. Foss. I, 1862. *Quebec group.*

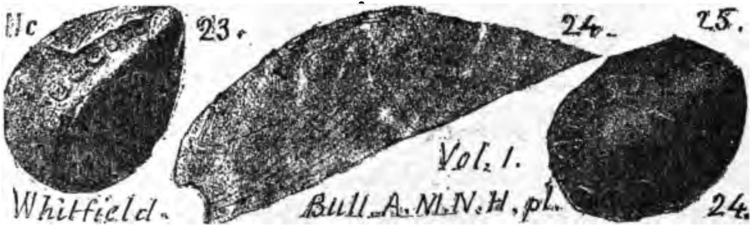
T. niobe (*M. niobe*, Bill.) *Calc. SS. II a.*

T. nycteis (*M. nycteis*, Bill.) *Calc. SS. II a.*

Tryblidium ovale, Whitfield, Bull. Amer. Mus. Nat. Hist. N. Y. Vol. 1, No. 8, 1886, page 305, plate 24, figs. 28, 29, *natural size*; type specimen, distinguished by its distinctly oval and low convex form, and strongly arcuate medinal line. Fort Cassin, Vt. "*Birdseye*" rocks, now recognized as *upper beds* of *Div. D*, of *Calc. Sandstone formation. II a.*



Trybiidium ovatum, Whitfield. Bull. Amer. Mus. Nat.

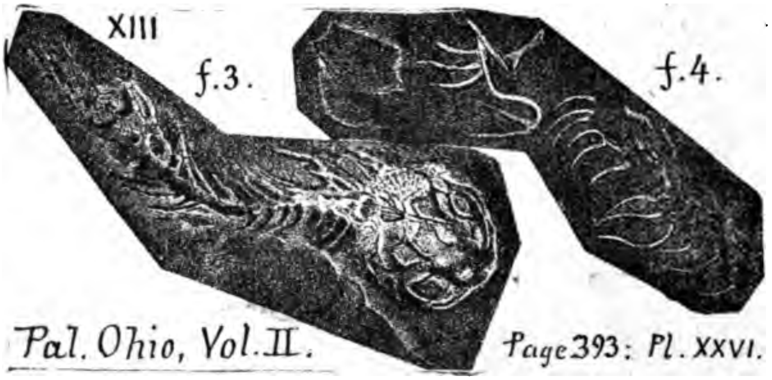


Hist. Vol. 1, p. 305, plate 24, figs. 23, *nat. size*, 24, *enlarged twice*, specimen preserving part of the shell; 25, ventral view of another one; no specimen yet found (1886) exceeding 1¼ inches in length; 8 pairs of scars, increasing in size from front to rear (as shown by the casts). Fort Cassin, Vt. *Calc. SS. Division D, upper part. II a.*

Tryblidium pileolum, Whitf. Bulletin of the Amer. Mus. N. Y. 1889, Vol. 2. No. 2, page 46, plate 7, figs. 15, 16, two views, *natural size*, two views of an ovate form; fig. 17, vertical view of a more circular specimen. Resembles *T.* (*Metoptoma*) *simplex*, Billings (Pal. Foss. I, fig. 334; Bull. A. Mus. Nat. Hist. I, plate 24), but is broader, lower, etc. A few found in compact limestone near base of Beekmantown, N. Y., section; more common in the *Ophileta beds* above, but easily overlooked because so small and obscure. *Calciferous sandstone. II a.*

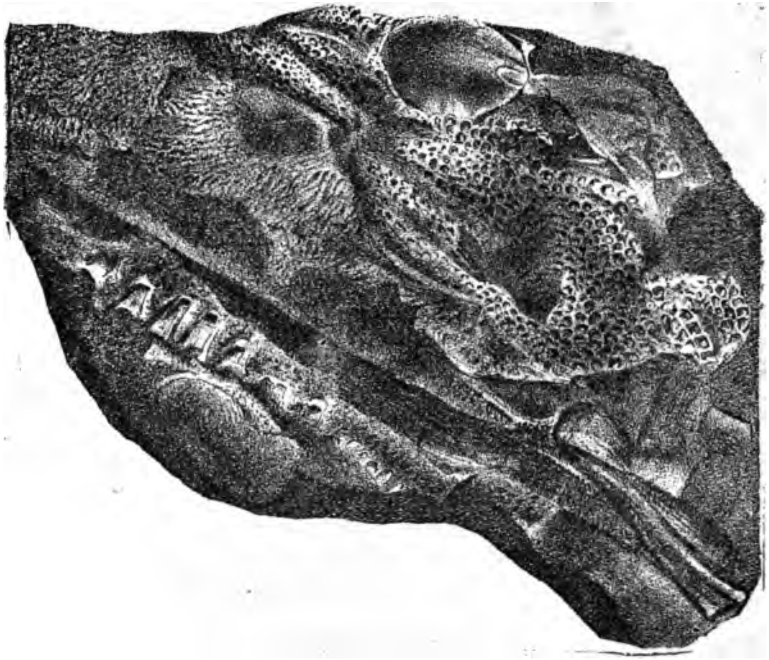
Tryblidium simplex (*Metoptoma simplex*, Billings, Pal. Foss. Vol. 1, 1865, p. 346). Whitfield Bull. Am. N. H., N. Y., Vol. 1, No. 8, 1886, page 306, plate 24, figs. 30, 31, views of the largest specimen found.— *Calciferous sandstone formation* (probably in Div. D, upper beds, which are so fossiliferous at Fort Cassin, Vt. Brainard & Seely, 1890.) *II a.*

Tuditanus brevirostris, Cope. Trans. Amer. Philos. Society, 1874. Pal. Ohio, Vol. 2, 1875, page 393, plate 26, fig. 3, 4, showing that the head of the reptile was large for its



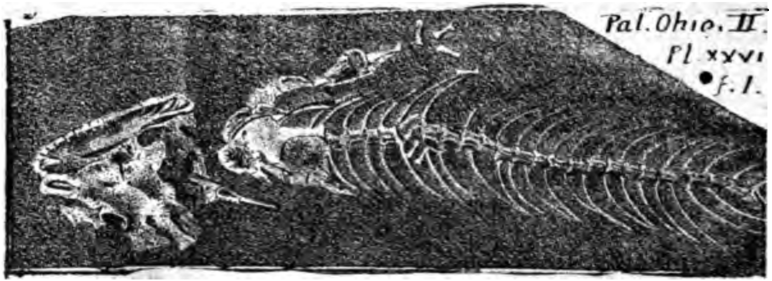
body, wide, and with a broad muzzle: head bones coarsely sculptured in radiating ridges; teeth of equal size, in two rows, etc.; breast-plates (bucklers) rather large, with coarse radiating ridges; fore and hind limbs, rather stout and short. —Ohio *coal measures*. *XIII.*

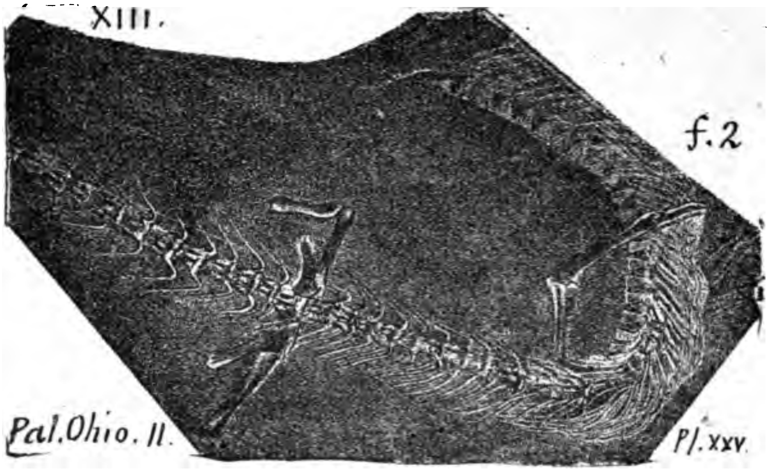
Tuditanus huxleyi, Cope. Trans. Amer. Philos. Society, Phila. 1874.—Pal. Ohio, Vol. 2, 1875, page 397, plate 34, fig. 2, *natural size*, portion of the skull, including right half of the upper surface, with part of jaw, of a specimen of the largest known species of this genus of *coal measure* reptiles. Teeth slightly conical, with delicately striated grooved cementum. Ohio. *XIII.*



Tuditanus longipes, Cope. (*Sauropleura longipes* Cope, Trans. Am. Phil. Soc. 1874.) Pal. Ohio, Vol. 2, 1875, page 398, plate 26, fig. 1, 2, *natural size* of an Ohio *coal measure* reptile; obscure skull; well developed ribs; tail long as in lizards; fore and hind legs; belly scales in form of slender rods; unique specimen from Linton, O. *XIII.* *Fig. on p. 1238.*

Tuditanus longipes. See p. 1237.

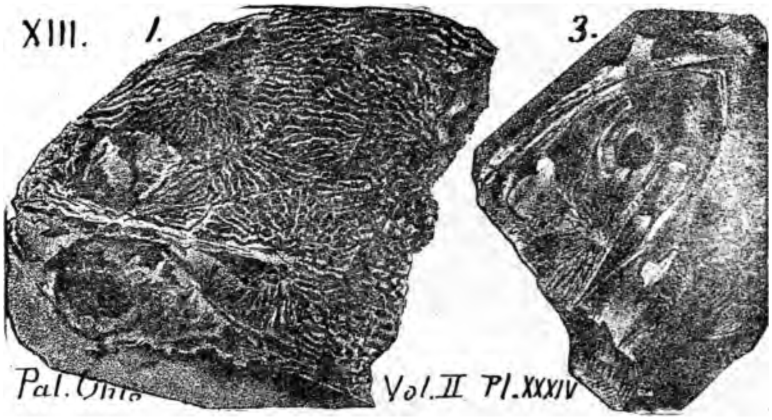




Tuditanus mordax, Cope. Pal. Ohio, Vol. 2, 1875, page 395, one specimen and a few fragments. *Coal measures. XIII.*

Tuditanus obtusus, Cope. Proc. Acad. Nat. Sci. Phil., 1868.—Pal. Ohio, Vol. 2, 1875, page 396, woodcut fig. 11, which reminds one of the figure of *Dendrerpeton acadianum*, from the Nova Scotia coal measures. See also Trans. Amer. Philos. Soc. Philada., Vol. XIV, p. 12. Known from two imperfect skulls from Linton, Ohio. *Coal measures. XIII.*

Tuditanus radiatus, Cope. Trans. Amer. Philos. Soc. Phil., 1874.—Pal. Ohio, Vol. 2, 1875, page 394, plate 27, f. 1, and plate 34, f. 3. *natural size.* The large eyes of this *Coal measure* reptile are very far forward; the muzzle narrow; hind



edge of skull deeply concave; the plates of the skull sculptured in radiating ridges forking in a remarkable manner (see wood cut restoration on page 395.) Fig. 3, represents (partly) the left half of a skull. No teeth have been found.—*XIII.*

Tuditanus tabulatus, Cope. Proc. Am. Phil. Soc. Phil., 1877. *XIII.*

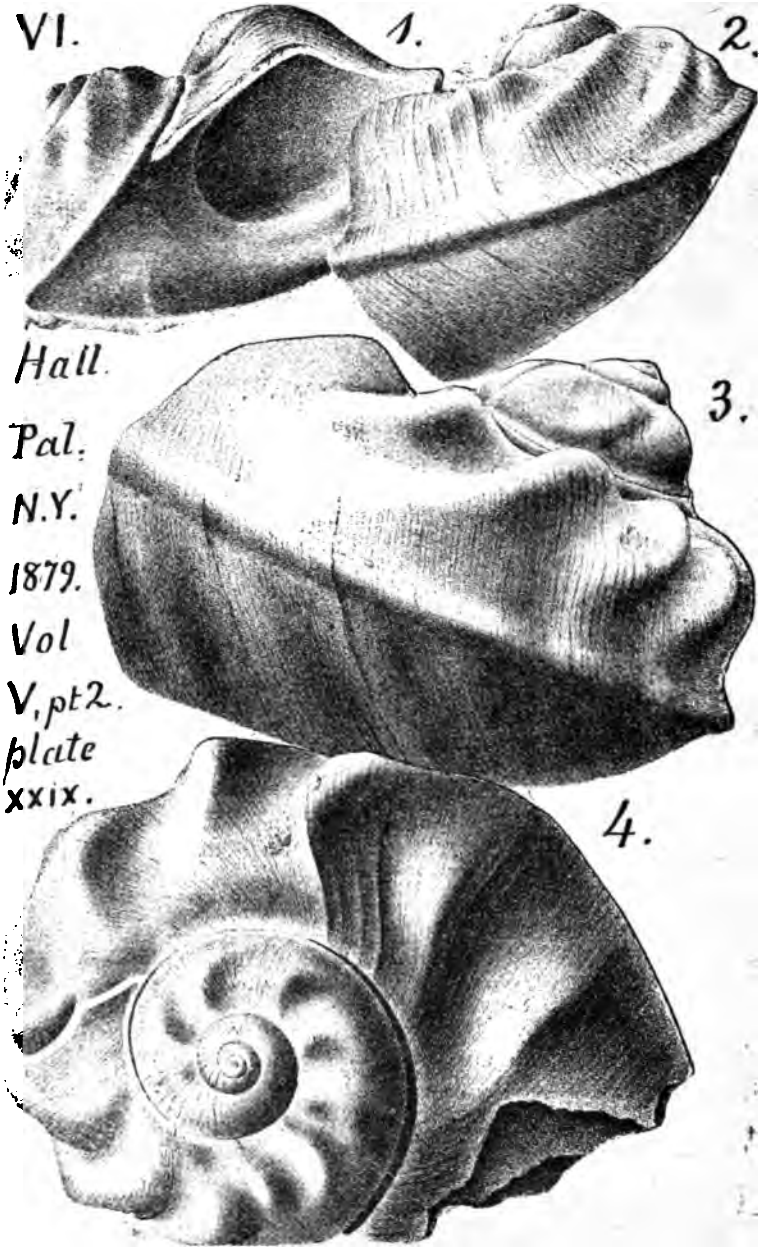
Turbo americanus. See **Holopea paludiniformis.** *IIc.*

Turbo lineatus. See **Pleurotomaria lineata,** *VIII c.*

Turbo obliquus. See **Holopea obliqua.** *II c*, *III b.*

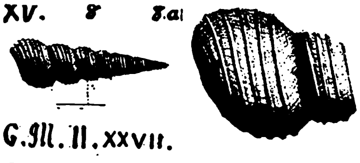
Turbo shumardii, De Verneuil. Hall, Pal. N. Y., Vol. 5 ii, 1879, page 135, plate 29, fig. 1, small specimen, aperture and lip perfect; 2, opposite side; 3, dorsal view of large specimen; 4, its summit. Differs from all other *Upper Helderberg fossils.* Outside aspect has an interesting likeness to *Palæotrochus kearnyi.* This beautiful fossil was lost sight of by American geologists until redescribed and refigured by James Hall in 1879. Not rare; but usually silicified and badly preserved; many interior casts at Falls of the Ohio, and elsewhere in Kentucky and Indiana; and some of the larger casts of *Upper Helderberg* gasteropods in New York may be of this species. It will probably be found in Pennsylvania in *formation No. VI.—For figure see page 1240.*

Turbo shumardii. Page 1239.



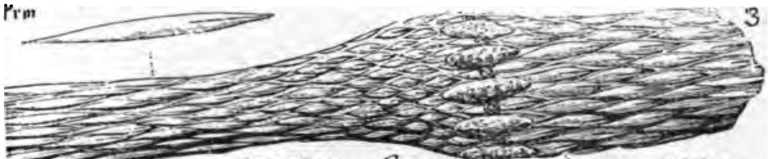
VI.
Hall
Pal.
N.Y.
1879.
Vol
V, pt 2.
plate
xxix.

Turritella, a long spiral shell; many species of various ages in many countries. See Dawson's account of the pre-historic necklace of 180 individuals of one of the Tertiary species, each an inch long, changed into white translucent chalcedony, strung upon a deer's sinew, found in a Belgian cave, and now in the Royal museum at Brussels. Modern Science in Bible-lands, pp 135, 191. New York, Harper & Brothers, 1889.



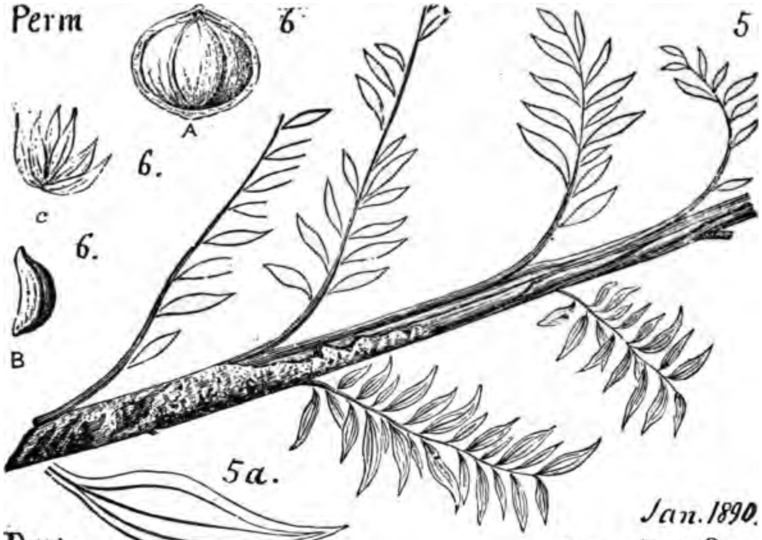
Turritella ? stevensana, Meek & Worthen, Geo. Sur. Ill., Vol. 2, 1866, page 382, plate 27, figs. 8, *enlarged*, side view; 8 *a*, *more magnified* body whorl and second whorl, to show surface markings; only known by the sharply defined molds it has left in the *Upper coal measure* rocks on the N. branch of Saline creek, Gallatin Co., Ill. So great is the influence of the evolution theory on most minds that Mr. Meek expresses his great reluctance to give even provisionally the name *Turritella* to it because, he says, " we have good reasons for believing that that genus was not introduced until long after the Carboniferous period. As it seems however (he adds) not to belong to any of the known Palæozoic genera, and is more like *the existing Turritella* than any of the Mesozoic or other more modern types, we have concluded," &c. " Its lines of growth curve much like those of *Loxonema*, from all the species of which, however, it differs in its revolving costæ. At first glance it might be mistaken for a *Murchisonia*, but it has no trace of a revolving band or labial sinus." He then refers to Swallow's " *very* similar little shell " *Murchisonia minima* from the Coal Measures of Lexington, Mo. (St. Louis Acad. Sci. I, p. 203;) and to Dr. Stevens' " somewhat similar " *Actis minuta* from the U. Coal measures of Danville, Ill. (Am. J. S. [2] xxv, p. 259.) —*XV.*

Tylodendron baini, Dawson.



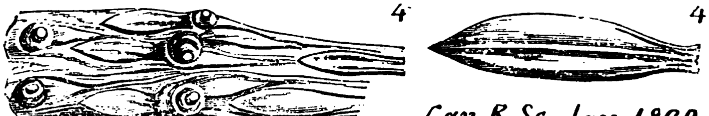
Dawson, Can. rec. sci. Jan. 1890.

Perm



Daw. Jan. 1890. Can. Rec. Sc.

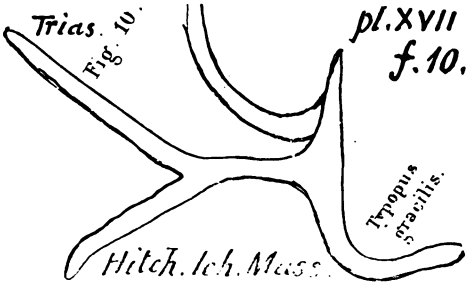
Permian D.



Can. R. Sc. Jan. 1890.

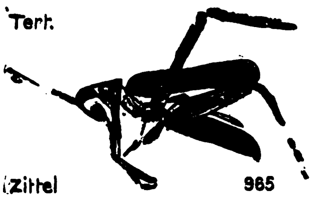
Typopus gracilis, *track.* Hitchcock. Ich. Mass., 1858, page 106, plate 17, fig. 10, *natural size*, a unique specimen from the Wethersfield cove red shale; therefore species doubtful. Probably this and *T. abnormis* will turn out to be quadrupeds. — *Trias.*

Trias. pl. XVII f. 10.

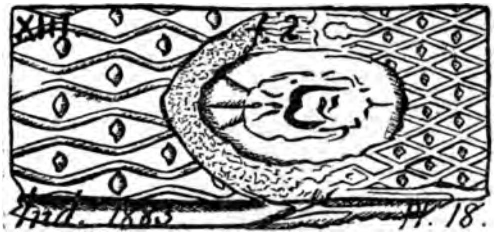


Hitch. Ich. Mass.

Tert.



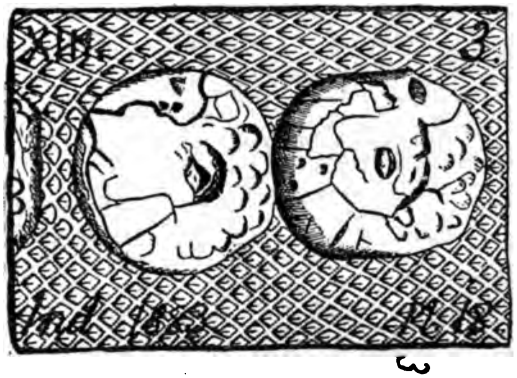
Tyrbula russelli, Scudder. A grasshopper found in the *Oligocene tertiary* beds of Florissant, Colorado. Zittle's handbuch, fig. 965, ($\frac{3}{2}$ natural size.) — Tertiary.



Ulodendron elongatum. (St. Flor. d. Vorw. 2, pl. 45; Lesq. Ill. Rt. 4, pl. 22, f. 3, 23. f. 1 to 3. *Lepidodendron ornatissimum.* Brongt. *Ulodendron minus.* Schp.) Coal Flora of Pa., p. 404, plate 65, fig. 2 to 4. Common at Morris where no U. *minus* is found. Not rare at Pittston, in the anthracite E vein.) Collett's Ind. Rt. 1883, page 85, plate 18, f. 2. Not rare, with *Ulo. ellipticum*, in coal A, above Conglomerate.— *Coal measures. XIII.*

Ulodendron flexuosum. See **Halonia flexuosa**, XIII.

Ulodendron majus, Ll. & Hutt. (Lesq. Geol. Pa., 1858, p. 875.— *Phytolithus parmatus*, Stein. Trans. Amer. Phil. Soc., Philad. Vol. 1, page 286, plate 7, fig. 1.— *Sigillaria menardi*, Lesq. Geol. Ill. Vol. 2, plate 43.) Coal Flora, Pa., 1880, page 401, plate 66, figs. 3, 3*a*. Spec. No. 581 of Mr. Lacoe's collection at Pittston, Pa., from *Coal E*, Butler mine, described.—In Alabama it is in *Subconglomerate coal;* which agrees with its recognition by Lesq. among Ashburner's plants from Sideling hill tunnel, Hunt. Co., from the *middle Pocono* coal measures (T3, 88). *X; XIII.*



Ulodendron minus (Ll. & Hutton; Sternberg; Schimper, Lesq. Coal Flora, p. 403, plate 66, fig. 4.— *Lepidodendron ornatissimum*, Bgt.; *Ulodendron punctatum*, St.; *Phytolithus parmatus*, Steinhauer, Trans. A. P. S. Phil. plate 6, fig. 1; abundant in Alabama *subcon-*

glomerate coal measures; also Ætna vein, Tennessee; Pittston anthracite Brown colliery E, and Seneca F, veins. Lesq.) Collett's Ind. Rt. 1882. *Subconglomerate coal.* — *X?*; *XIII.*

Ulodendron punctatum, Europe. See **U. minus.** *XIII.*

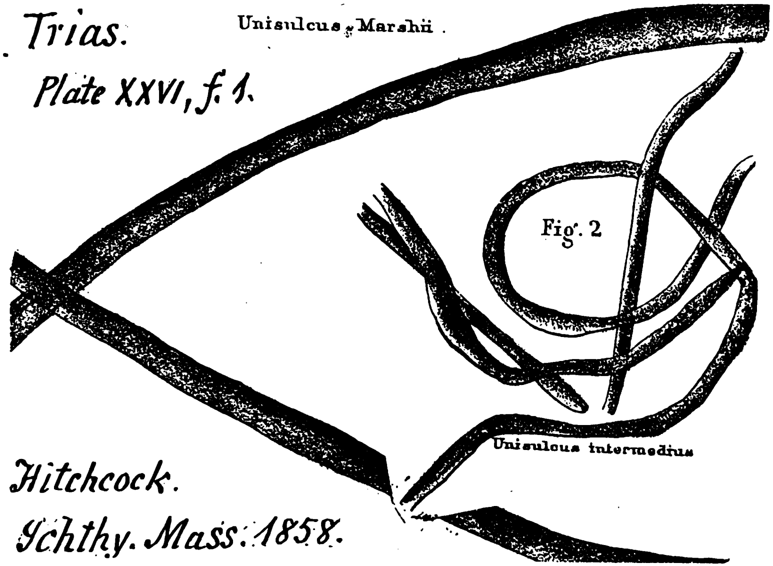
Ulodendron stems in the Darlington plant bed, Beaver Co., Pa., (Q, 234).—*XIII.*

Ungulina suborbicularis. See **Cardiomorpha suborbicularis.** *VIII f.*

Unio orthonata. See **Cypricardia orthonata.** *IV.*

Unio premigenius. See **Modiolopsis alatus.** *IV.*

Unisulcus intermedius, *track.* Hitch. Ichnol. Mass. 1858, page 161, plate 26, fig. 2, *nat. size;* grooves very numerous and crooked, on the surface of grey micaceous sandstone at Turner's falls, Mass., strikingly resembling the trackways of the common earth-worm on mud after a light rain in summer. *Trias.*



Trias.
Plate XXVI, f. 1.

Hitchcock.
Ichthy. Mass: 1858.

Unisulcus magnus, E. H. Hitchcock, new species. Proc. Boston Nat. Hist. Soc. Dec. 19, 1888. A fossil reptile's footprint in the *Upper Triassic sandstone* at Milford quarries on the New Jersey side of the Delaware river, ten miles below Durham creek in Bucks Co., Pa., and about three miles from the mountain. (MS. letter, Dec. 18, 1888). — *Trias.*

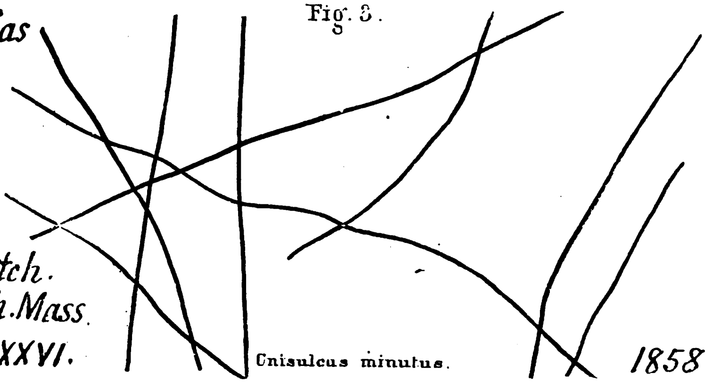
NOTE.—No figure is given of this fossil because it is nothing but one long grrove, made by the tail or the breast of the reptile. (C. H. H. Letter of March 3, 1889.)

Unisulcus marshii, *track.* (*Herpystezoum marshi.*) (Figure with *U. intermedius* above.) Hitchcock Ich. Mass. page 160, plate 26, fig. 1, *nat. size;* might be regarded as the trail of some small mollusc (shell); but looks rather like the smooth furrow left by the earth or angle-worm; shells plough a furrow and leave a ridge on each side. — *Trias.*

Unisulcus minutus, *worm? track.* Hitchcock Ich. Mass. 1858, page 161, plate 26, fig. 3, *nat. size.* (This was called first Herpystezoum minutum in his "Fossil Footmarks of the United States," plate 17, fig. 3.) — Turner's falls. *Trias.*

Trias

Fig. 3.



Hitch.
Ich.Mass.
Pl.XXVI.

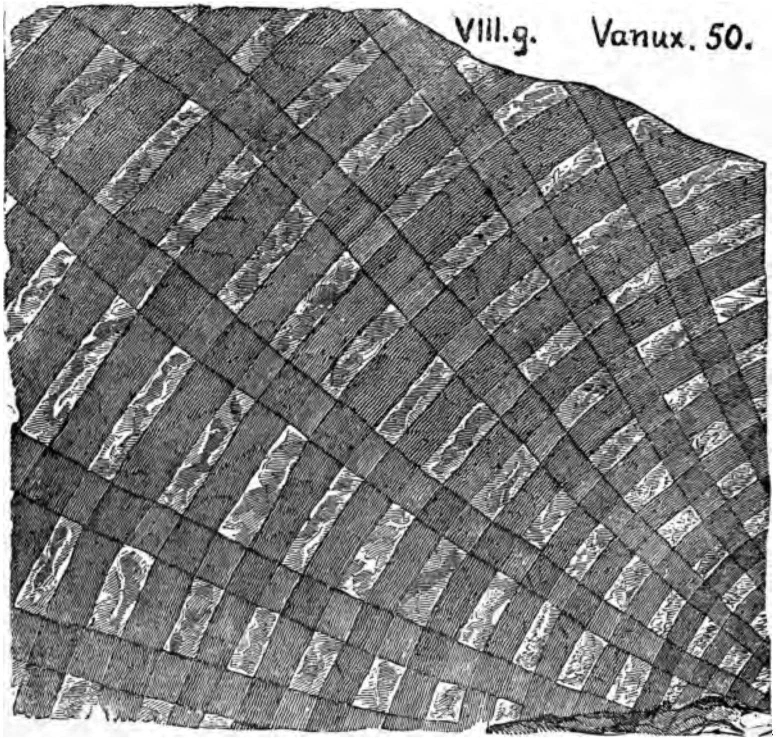
Unisulcus minutus.

1858

Univalve shells, of undetermined species, mostly *Pleurotomariæ,* and very minute in size, are extraordinarily numerous in some of the limestone beds of the coal age, but are only to be seen on surfaces long exposed to the weather. They are sometimes seen even on the non-fossiliferous *Freeport limestone* of the lower or Allegheny river coal measures (K, 86; K, 341). They crowd the limestone 15′ to 20′ beneath the *Pittsburgh coal* (K, 236, 316). They give a characteristic aspect to some of the beds of the *Great limestone* of the Upper or Monongahela river coal measures, both in Salisbury basin in Somerset

Co. and in the southwestern counties, especially the topmost layers (K, 231; K3, 307); also, 20′ above the top of the *Great limestone.* In the still higher Upper Barren measures, they are innumerable in a *fish bed* (with small crustaceans) 110′ beneath the Jollytown coal of Greene Co., and in the brecciated limestone No. 6 of Stevenson's series, in Peters township, Washington Co. (K, 225, 227).

Uphantænia chemungensis. Vanuxem, page 183, fig. 50,

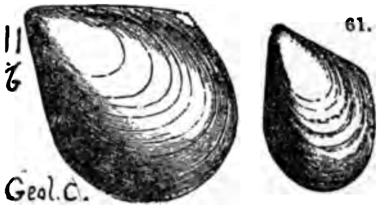


Chemung formation. VIII g.—Supposed for a long time to be a sea plant. Now placed among *Protozoa.* The specimen, found by Mr. Leech near Ithaca, N. Y., and deposited in the N. Y. State collections, shows a net work of "woven tape" (*Uphantos*, *Tænia*), or rather of cords pressed flat and thin. No doubt it was a *sponge*, and grew in a complete circle, or perhaps spiral, like *Receptaculites*, *Dictyophyton*, *Archimedes*, *Calathium*, *Astylospongia*, &c.

U. dawsoni. See **Physospongia dawsoni.**

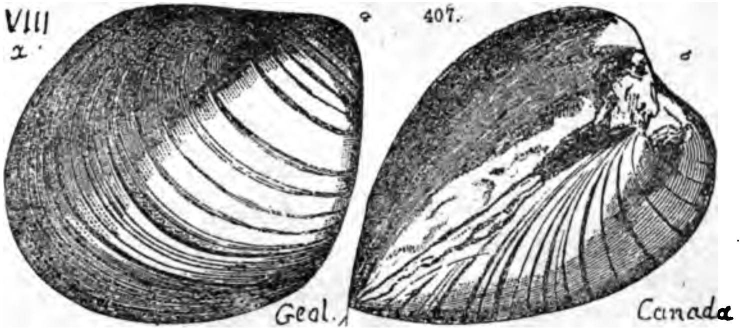
Ursus pristinus, Leidy. Proc. A. N. S. Phil., 1854, p. 90. Holmes' Post. Foss. S. C., 1860, p. 115, pl. 23. Teeth and vertebræ of this extinct bear were found in the Port Kennedy cave, Chester Co., Pa., Cope, Proc. A. P. S. 1871, p. 96. Thus America had its *Cave Bear*, different from the *Ursus spelæus* of Europe, as large as the present grizzly bear, and therefore better fitted for feeding on the gigantic sloths whose bones are found with it in the Port Kennedy cave. *PP.*

Vanuxemia montrealensis, (properly **Cypricardites.**) Billings. Canadian Naturalist and Geologist, Vol. 4, 1859. Logan's Geology of Canada, 1863, page 131, fig. 61*a*, b. *Chazy limestone formation. II b.*



61.

Vanuxemia **tompkinsi.** Billings. Logan's Geology of Canada, 1863, page 375, fig. 407. *a* side view; *b*, backview. *Corniferous limestone* (*Upper Helderberg*) *formation. VIII a.*



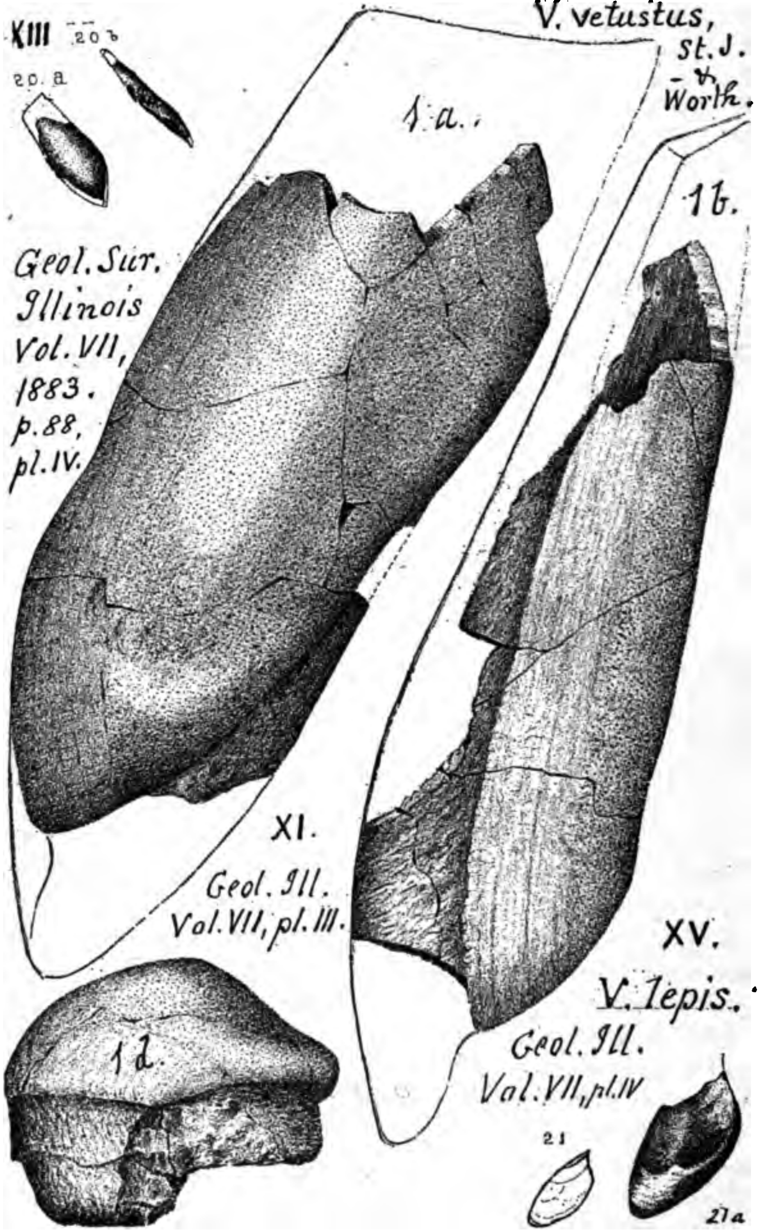
407.

Variolaria ficoides. See **Stigmaria ficoides.** *XIII.*

Vaticinodus ? carbonarius, St. John & Worthen, Geo. Sur. Ill., Vol. 7, 1883, page 88, plate 4, figs. 20 *a*, *b*, two views of a small unique tooth, which may perhaps be a *Stenopterodus*, found in the roof of *Coal bed No. 5*, at Carlinville, Ill. *XIII.—See figure at top of page 1249.*

Vaticinodus discrepans, St. John & Worthen, Geol. Ill., Vol .7, 1883, page 83, plate 3, fig. 2 *a*, the crown surface of a large fish tooth; *b*, cross profile, inner margin; *c*, fore shortened

Vaticinodus carbonarius.



V. vetustus, St. J. & Worth.

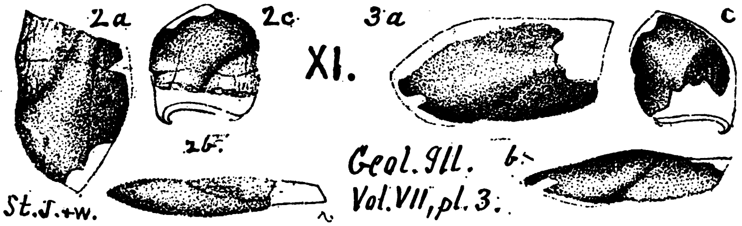
Geol. Sur. Illinois Vol. VII, 1883. p. 88, pl. IV.

Geol. Ill. Vol. VII, pl. III.

V. lepis.

Geol. Ill. Vol. VII, pl. IV

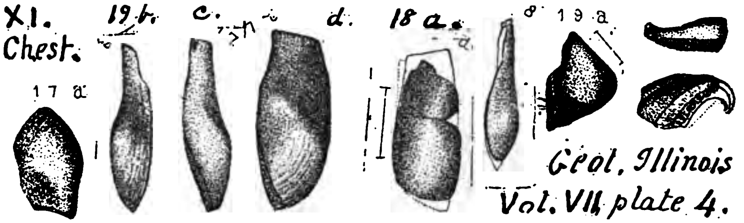
Vaticinodus carbonarius. *See page 1247.*



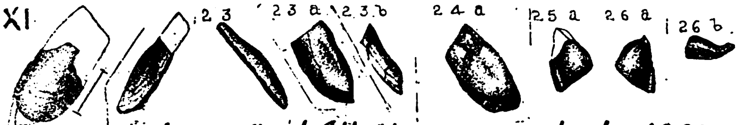
vein from front; found in the *upper fish bed* of the *Subcarboniferous Burlington limestone* at Agusta, Iowa. *XI.*

Vaticinodus lepis, St. John & Worthen, Geo. Sur. Ill., Vol. 7, 1883, page 88, plate 4, figs. 21 *a*, *b* (given with *V. carbonarius*, on page —), the much worn crown of a unique fish tooth differing from *V. carbonarius*, and also from any species of *Orthopleurodus*, with which it is found associated in the upper limestone of the *Upper Coal Measures* at LaSalle, Ill. *XV.*

Vaticinodus ? similis, St. John & Worthen, Geo. Sur. Ill., Vol. 7, 1883, page 86, plate 4, figs. 17 *a*, *b*, *c*, *d*, 18 *a*, *b*, 19 *a*, *b*, *c*, teeth from the upper jaw of a *Subcarboniferous* (*Chester limestone*) fish, found associated with what might be lower jaw teeth, easily mistaken for worn teeth of a *Deltoptychius*. They have also the characteristic straight hind-side edge of teeth of *Orthopleurodus*, perhaps identical with the *St. Louis limestone V. simplex.* "Until more complete materials shall have been acquired, the determination of the generic identity of these fragmentary dental remains will necessarily remain in a state of uncertainty. So intimately are the species of *Vaticinodus*, *Stenopterodus* and *Deltoptychius* linked together, that it might be anticipated the more differentiated forms of *Orthopleurodus* may have had ancestors in direct line as early as the time when the sediments of the St. Louis and Chester formations were in process of deposition." *XI.*



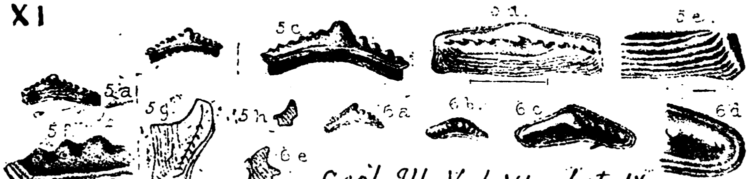
Vaticinodus ? simplex, St. John & Worthen, Geo. Sur. Ill., Vol. 7, 1883, page 84, plate 4, figs. 22 *a*, *b*,23, *a*, *b*, 24 *a*,25 *a*, *b*, *c*, small upper front teeth of a *Subcarboniferous* (*St. Louis*) *limestone* fish, in their general aspect strikingly like those of *Deltoptychius expansus*. Found at St. Louis, Alton and Pella on the Mississippi river. *XI.*



St. Louis L. Geol. Ill. Vol. VII. Plate 4, 1883.

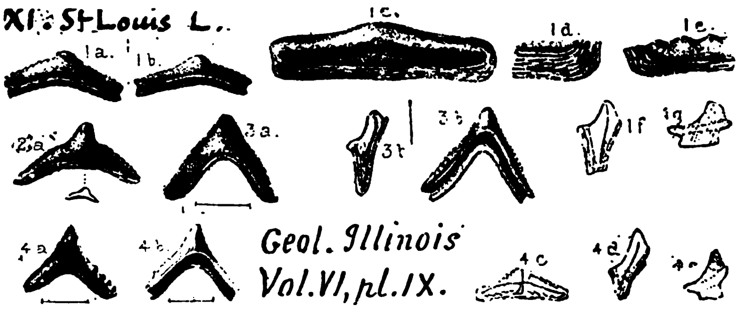
Vaticinodus vetustus, St. John & Worthen, Geo. Sur. Ill., Vol. 7, 1883, page 82, plate 3, fig. 1 *a*, the crown surface of a large unique left back jaw tooth; *b*, its inner margin (*c*, omitted, its outer enrolled margin); *d*, profile from behind; from the upper most *Kinderhook limestone* bed, Iowa; very much like Lord Enniskillen large Oreton tooth, Shropshire, England. Also somewhat like DeKoninck's Belgian carboniferous *Streblodus tenerrimus*. *XI.*

Venustodus argutus, St. John & Worthen, Geo. Sur. Ill., Vol. 6, 1875, page 352, plate 9, figs. 5 *a*, concave face of medium size fish tooth; *b*, convex face; *c*, ditto *enlarged twice; d*, *enlarged* outline from above showing arrangement of basal folds; *o*, *enlarged* coronal belt; *f*, *enlarged* profile view; *h*, profile section; 6 *a*, concave face of smaller arched tooth; *b*, from above; *c*, *enlarged twice*, ditto; *d*, *magnified* view of one end to show disposition of coronal folds (*e* omitted). Chester, Ill. *Upper fish bed*, *Chester limestone*. *XI.*



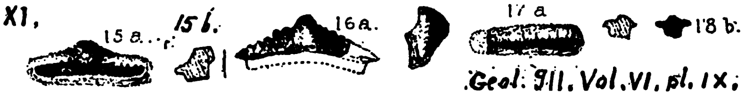
Geol. Ill. Vol. VI. plate IX

Venustodus leidyi (*Chomatodus venustus*, Leidy.) St. John & Worthen, Pal. Ill., Vol. 6, 1875, page 350, plate 9, fig. 1*a*, concave face of tooth; *b*, convex face; *c* (*X 2*) view from above; *d*, *e*, *enlarged* folds in both faces; *f*, *g*, *enlarged* profile outline and section; 2*a*, *nat. size* and *enlarged* minute tooth;



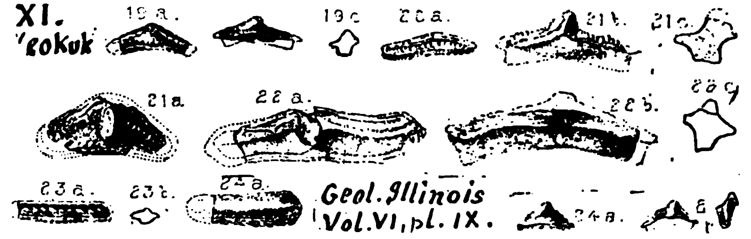
3 *a*, *b*, *c*, (X 2) small arched tooth; 4*a*, *b*, (X 2) two faces of still smaller tooth; *c*, *d*, *e*, crown profile, and section. Alton, Ill., *St. Louis lime*. *XI.*

Venustodus robustus. St. John & Worthen, Geo. Sur.



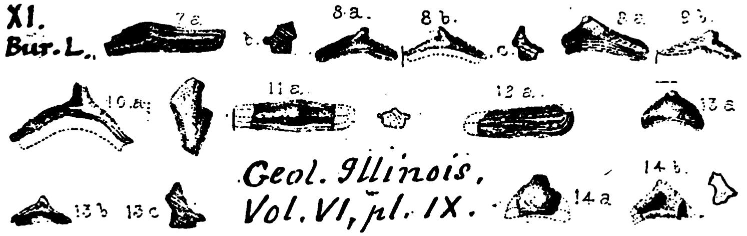
Ill., Vol. 6, 1875, page 345, plate 9, figs. 15*a*, *b*, medium size fish tooth; 16*a*, *b*, large sharp crested variety; 17*a*, *b*, small linear variety; 18 *b*, *enlarged twice*, minute tooth in profile. Strikingly like *Helodus angularis*, N. and W., but distinguished by the imbricated belt surrounding the crown. Common in the *upper fish bed* of the *Burlington limestone*, Iowa. *XI.*

Venustodus tenuicristatus, St. John & Worthen, Geo.



Sur. Ill., Vol. 6, 1875, page 348, plate 9, figs. 19, 20, 21, 22, 23, 24. "However variable these teeth may appear on casual examination, a more intimate acquaintance derived from the comparison of a large suite of specimens reveals a remarkable identity of features common to all, such as readily distinguish them as a whole from the allied though specifically distinct forms noticed from other horizons. Nor does this variability shade off into these specific forms, each of which, while they present an equal degree of variation, is marked by certain persistent features peculiar to it." (St. J. & W.) Common in the fish bed of the *Keokuk limestone*. *XI.*

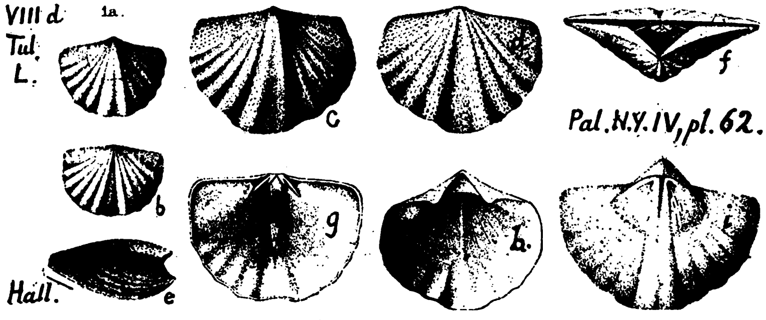
Venustodus variabilis, St. John & Worthen, Geo. Sur.



Ill., Vol. 6, 1875, page 346, plate 9, fig. 7*a*, normal size and form of tooth seen from above; 8*a*, concave crown face of medium tooth; 9*a*, less denticulated variety; 10*a*, large tooth; 11*a*, small low crested; 12*a*, very flat variety; 13*a* small triangular, acuminate tooth; 14*a*, more robust tooth of the same variety; *b*, deep base and interrupted crown folds. So intimately related to *V. tenuistriatus* of the *Keokuk limestone* as to make distinction difficult; " it seems hardly possible to foretell the results of an examination of a larger suite of the Keokuk specimens." (Three varieties are then described.) Common in the *Upper Burlington fish bed*, Iowa and Illinois. *XI.*

Vespertilio ? Bats' bones of extinct species? Port Kennedy cave earth. Cope, Proc. A. P. S. 1871, p. 95. *PP.*

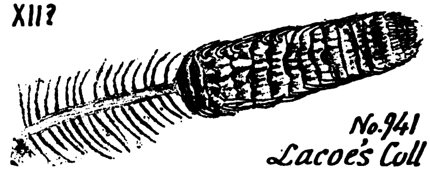
Vitulina pustulosa, Hall. 13th An. Rt. N. Y., 1860; Pal.



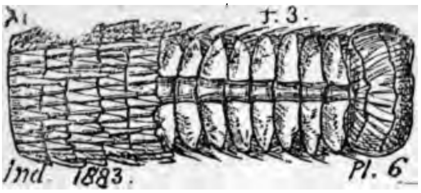
N. Y. Vol. IV, 1867, page 410, plate 62, figs. 1 *a*, large ventral valve; *b*, large dorsal valve; *c*, *d*, *e*, *f*, *enlarged three times*, ventral, dorsal, profile, and cardinal views showing the pustules on the surface; (in *f* the hinge process and socket plates are visible through the broad open ventral deltidium); *g*, (X2) dorsal interior; *h*, (X2) ventral interior; *i*, (X2,) ventral cast. — In Perry Co., Pa., at Barnett's mill, Spec. 11,659 (twenty-one examples) in *Hamilton upper shales*, below the *Fenestella* bed of Claypole's sections; and at Brickfield, near New Bloomfield, Spec. 12,499, in the same. — Monroe Co., Spec. 804 -10, -13, -15, -18, -19 (ten), -22, in the collections from Marshall's Creek, Monroe Co. (Small specimens, marked *Spirifera mesacostalis* resembling the figures of *Vitulina pustulosa* in Hall's Pal. N. Y. Vol. 4, plate 60, figs. 1*a*, 1*b*) were identified by Jas. Hall, as *Spirifera fimbriata*. The same of 807-27, -32, -60; and 810-3, from Dingman's falls, Pike Co.— *VIII c.*

Volborthella tenuis, Schmidt, (Mem. Imp. Acad. Sc. St. Pet. [7] Vol. 36, No. 2, p. 25, plate 2, figs. 27-31,) a curious little primordial cephalopod shell, chambered like an *Orthoceras*, hitherto only known from the *Cambrian Blue Clay* of Russia, in company with trilobites (*Mesonacis*) lingulas (*Mickwitza*), *Platysolenites*, &c., but recently found by Matthew in *Sub-St. John* (*Basal Cambrian*) *series*, *Div 2*, *Band b*, of the Hanford brook section, New Brunkswick; also in the *St. John group*, *Div. 1*, *Band b*, at Belyea's Landing, Westbrook, N. B.; scarce; in clusters buried at all angles in the mud-rock; 1/16″ to 1/8″ long; chambers short, conical, arched downward, with very small siphuncle; no trace of shell left, but traces of delicate cross striation. (Schmidt's description.) No traces of siphuncle seen by Mathew. Trans. R. S. Canada, 1889, page 135, plate 8, fig. 5 *a*, *b*, *c*, *d*, *magnified twice.*—NOTE. This fossil should be carefully looked for in the South Mountains of Pa., south of the Chambersburg turnpike, where the red rocks of the Lower Cambrian seem to be present, and perhaps the St. John group. — *For figures see Appendix.*

Volkmannia brevistachys, Lesq. G. B. Simpson's drawing (1889) of specimen No. 941, in Mr. Lacoe's collection at Pittston, Pa., from Washington Co., Arkansas. *Low coal. XII?*



Volkmannia fertilis. (Lesquereux, Coal Flora of Penn., 1882, page 720, plate 90, fig. 4; roof of anthracite coal B. at Archbald; others in Stark Co., Ill.) Collett's Ind. Rt. plate 6, fig. 3. — *Coal measures.* — *XIII.*



Walchia longifolia, Emmons. See **Palissya braunii.** *Trias.* (*Rhætic ?*)

Waldheimia formosa. See **Rhynchospira formosa.** *VII.*

Waldheimia globosa. See **Trematospira globosa.** *VI.*

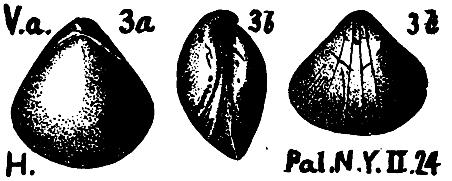
Walrus tusks in the South. See note to report III, preface, p. xvi.

Water fleas were abundant in the Silurian, Devonian, and Carboniferous ages. — *Oscracod* and *Phyllopod* tribes. — bivalved *Entomostraca.* See T. Rupert Jones' article in the Monthly Microscopical Journal, London, Oct. 1870, where enlarged figures of species of *Aechmina*, *Bairdia*, *Beyrichia*, *Carbonia*, *Cyprella*, *Cypridina*, *Cypridella*, *Cythere*, *Cytherella*, *Cytherellina*, *Entomis*, *Entomoconchus*, *Estheria*, *Isochilina*, *Kirkbya*, *Leaia*, *Leperditia*, *Moorea*, *Primitia*, and *Thlipsura*, are given. — See also his article on some Palæozoic Ostracods from N. America, Wales, and Ireland, in the Q. J. G. Soc. Lond. Vol. 46, Feb., 1890, with four plates, and figures of new genera: *Primitiopsis*, *Strepula*, *Bollia*, *Klœdenia*, and *Xestoleberis.* — See **Strepula** (*Beyrichia*) **quadrilirata** above.

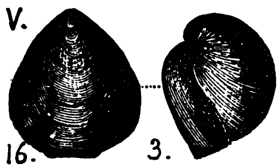
Water plants. The existence of **Sea weeds (Algæ)** in the earliest (*Cambrian*) ages of life on the planet has been denied. Nathorst and others have asserted that the cellular tissue of plants when buried in the shore sands perishes totally and leaves no trace, not even a film of carbon. But Matthew says that "when buried in clay the result is different. In the *Till* and *Leda clays* of the Acadian coast, which have considerable antiquity, [he] has seen *Polysiphonias* and other delicate seaweeds as well preserved as the ferns and *Asterophyllites* of the shales of the *Carboniferous system.*" He gives figures of indubitable *Cambrian fucoids* in his memoir "On Cambrian Organisms in Acadia," read before the R. S. Canada, and published in its Trans. Sect. IV, 1889, page 144, plates 5, 6. (See *Buthotrephis antiqua*, *Phycoidella stichidifera*, *Palæochorda cetacea*, *Hydrocytium silicula*, and *Microphycus catenatus*, in Appendix to this Dictionary.) — C.

Weissites vesicularis. Europe. See **Odontopteris schlotheimii.** *XIII.*

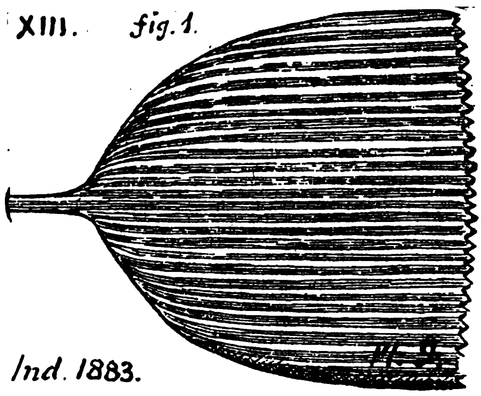
Whitfieldia intermedia, Davidson. (*Atrypa intermedia*, Hall.) Correction of R. P. Whitfield, Jan., 1889, for page 56 of this Dictionary.



Whitfieldia naviformis, misplaced on page 57 above, under its old name of *Atrypa naviformis.* (R. P. Whitfield's corrections, Jan. 1887.)

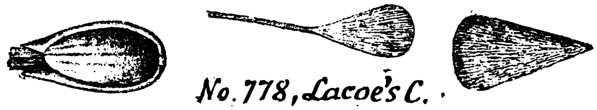


Whittleseya elegans. (Newberry, Annals of Science of Cleveland, Vol. 1, 1853, p. 116, fig. 1 to 2 *b*; related to *Cyclopteris digitata*, Brgt. plate 61 bis. — *Ginkgo digitata*, Heer Flor. Arct. 4, pl. 10, f. 1 to 10; also to *Cyclopteris crenata*, Braun. Pal. 9, plate 13, f. 8; its leaves mixed with a multitude of fruit, *Trigonocarpus*, *Rhabdocarpus*, etc.; Collected by Newberry first at the mines of Cuyahoga Falls, O., Lesq.) Collett's Ind. Rt. 1882, page 97, plate 9, f. 1. *Coal measures.*—In Mercer Co., Pa., it is reported by White in

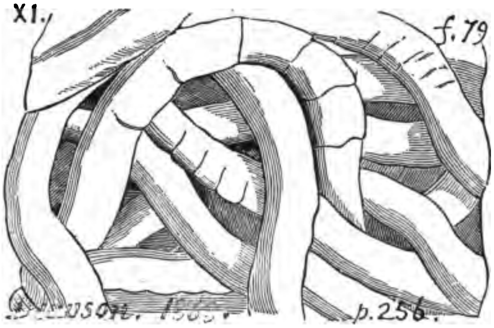

XIII.
fig. 1.
Ind. 1883.
Pl. 9.

the roof shale of the *Sharon bed* near the bottom of the *Conglomerate* (Q3, 53, 126). — In Tioga Co. Blossburg coal basin, the roof shale of the lowest coal bed has a *Whittleseya* which may be *elegans*, but is ill preserved. If undoubted specimens of *W. elegans* be found in this "Kidney bed" it will go far towards solving the difficulties retarding a common classification of eastern anthracite and western bituminous series. (G5, 52.) — In Mr. Lacoe's cabinet at Pittston are a large number of very fine specimens of it collected by his own collectors directly from coal localities in Washington Co. Arkansas; (Lesquereux's "sub-conglomerate coal"); also near Birmingham, Alabama; also Dade Co. Georgia; also in Tennessee, 40 miles N. from Chattanooga. — (Lacoe, March 14, 1890.) — This is important as fixing at these distant localities the geological horizon of the Inter-Conglomerate (Block or *Sharon*) coal, at least as far as palæobotanical evidence avails for such a purpose. It also confirms the correctness of the instinctive conclusions of the venerable botanist Lesquereux as to the early age of the Arkansas and Alabama coals, at least such of them as he obtained his specimens from. — *XII.*

Whittleseya microphylla, Lesq. G. B. Simpson's drawing (1889) of specimens 778, in Mr. Lacoe's collection at Pittston, Pa.


No. 778, Lacoe's C.

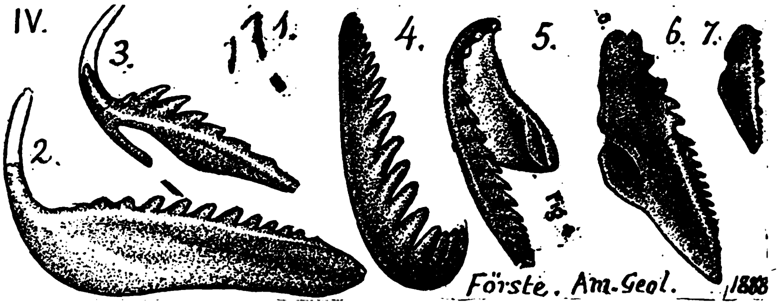
Worm burrows in the Lower Coal measures of Nova Scotia. Dawson's Acadian geology, 1868, page 256, fig. 79, a good example of what may be seen in almost all the sandstone strata of Pennsylvania and of the world from the earliest to the latest age, and on the shores of the present seas. They used to be considered fossil sea weeds. They are abundant, for example, at



Upton's quarry, Warren Co., (IIII, 201), in the *Third Oil Sand* (*Panama conglomerate*). *VIII-IX.* — Groups of irregular pits, from an ⅛ to ½ inch deep, cover the surface of *Catskill* rocks, in Bedford Co. (T2, 74). *IX.*

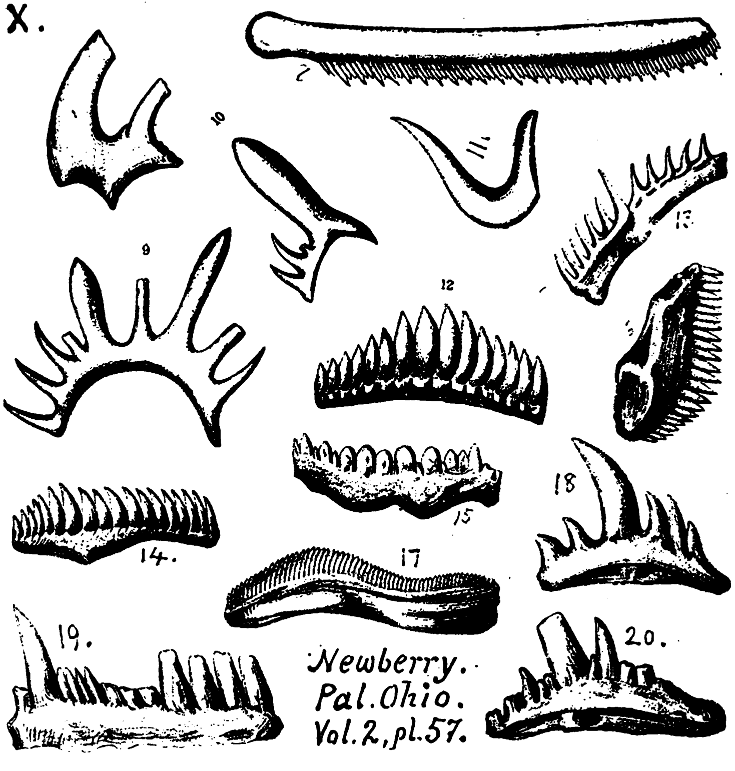
Worm teeth *of Medina Sandstone age*, in Ohio, at Todd's

IV.

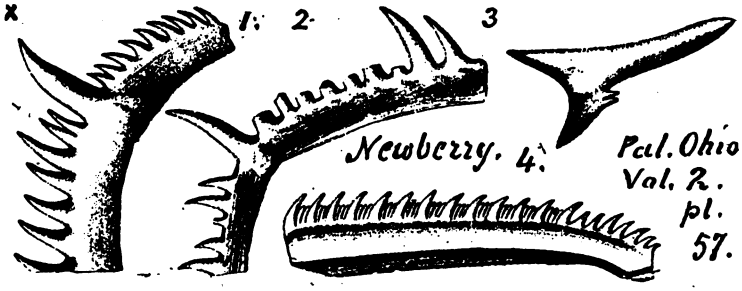


Förste. Am. Geol. 1888

X.



Newberry. Pal. Ohio. Vol. 2, pl. 57.



Fork of Miamee river, figured (*much enlarged*) and described by Aug. F. Foerste, in the American Geologist, December, 1888, page 416; fig. 1, small *graptolite-like* black streaks on the same weathered surfaces of the sandstone from which the fossil teeth project as small black shining bodies; the streaks being probably the fossil skin of the worm. The other figures are named after J. G. Hinde's classes of now living worms, which must differ materially from those of Silurian and Devonian times. Fig. 2 **Œnites deripiens**; 3, **Arabellites procursus**; 4, **Lumbriconereites austini**; 5, **Eunicites falcatus**; 6, **Eunicites confinis**; 7, **Eunicites paululus**. (Fig. 5 is only $\frac{1}{12}$, and fig. 6 $\frac{1}{10}$ of an inch long.) NOTE.—The whole Medina formation is only a few feet thick in Ohio; three thousand feet thick in Pennsylvania; yet a careful search may discover these minute fossils and a pocket lens will reveal their forms. — See **Conodonts**. — It is curious that in Ohio the Medina holds no other fossil; and in Pennsylvania almost nothing but worm burrows (so-called fucoids). — Various forms from the Cleveland shale are given by Newberry in Pal. Ohio, Vol. 2, 1875, page 41, plate 57, figs. *1* to *20*. In the *Cleveland shale* of the *Waverly* or *Pocono formation*, these minute organs are found in great numbers at Bedford, Cuyahoga Co., Ohio. They are only from $\frac{1}{20}$ to $\frac{1}{4}$ of an inch in length, usually arched and set with denticles or toothlets, lance shaped and very sharp at the edges and points; material slightly translucent, horn-like in color, much like the enamel of many teeth; numbers immense; varieties of form great. Pander called them (Conodonts) teeth of small sharks. R. Owen allies them to the spines, hooklets and toothlets of naked mollusks and worms (annelids). See his Palæontology, p. 116. Morse thought them the teeth of mollusks, *Doris*, *Æolis*, &c. Stimpson, that they might be the tongue-teeth of mollusks. — *X*.

Worm tracks, of a great variety of aspect, are common on the surfaces of rocks of all ages. See, for an example, specimen 802–1, in the collections from Orbisonia, Huntingdon Co., Pa., *Hamilton*, *VIII c;* and spec. 3274 (O, page 146), on a grey green sandstone from Venango Co. *Pocono*. *X*.

Worm tubes, the name given to *Worm burrows* by some geologists. (*See* **Scolithus** *above*.) — In his admirable lecture on the Origin and Age of the Highlands of Scotland, before the Royal Institution, Prof. Giekie, Director of the Geological Survey of Great Britain, narrates the remarkable part which the innumerable worm tubes in the *Moine schists* play in demonstrating the crushing, sliding and folding of the earth crust along belts of great disturbance. He says: "Every stage can be traced from a sandstone or conglomerate into a perfect schist, and from the most typical coarse Archæan gneiss into a fine laminated slate. Where the feeblest amount of alteration has taken place, the rock has been merely somewhat crushed, its larger crystals or pebbles fractured, and the separated portions recemented. A further stage is shown where the finer material has been more comminuted and drawn out round the flattened and elongated crystals or pebbles. The feldspars and hornblendes are first left as 'eyes', and then crushed down till they disappear in the general matrix. The harder quartz pebbles, in the planes of great movement, are pulled out to twice or four times their length, or flattened into thin plates like pennies. One of the most singular proofs of this internal movement of the component particles of even so obdurate a rock as quartzite is shown in the deformation of the worm-tubes. As these tubes come within the influence of the movement their vertical position changes into an inclined one, and they become gradually flatter and more drawn out, till at last, before they cease to be traceable, they appear as mere long ribbons on the surface of the rock, which then becomes a quartz schist." (Proc. R. Inst. Lond. June 7, 1889, page 539.) It is perhaps possible that the black shining ribbon-like, so-called fossil sea weeds of the Peach Bottom Roofing Slate quarries of York Co., Pa., on the Maryland line, may be worm-tubes which have suffered similar treatment; but there are too many instances of apparent embranchment among them to make such a suggestion probable. (*See figures* of them under **Buthotrepsis flexuosa** in the *Appendix.*)

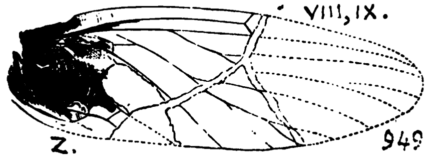
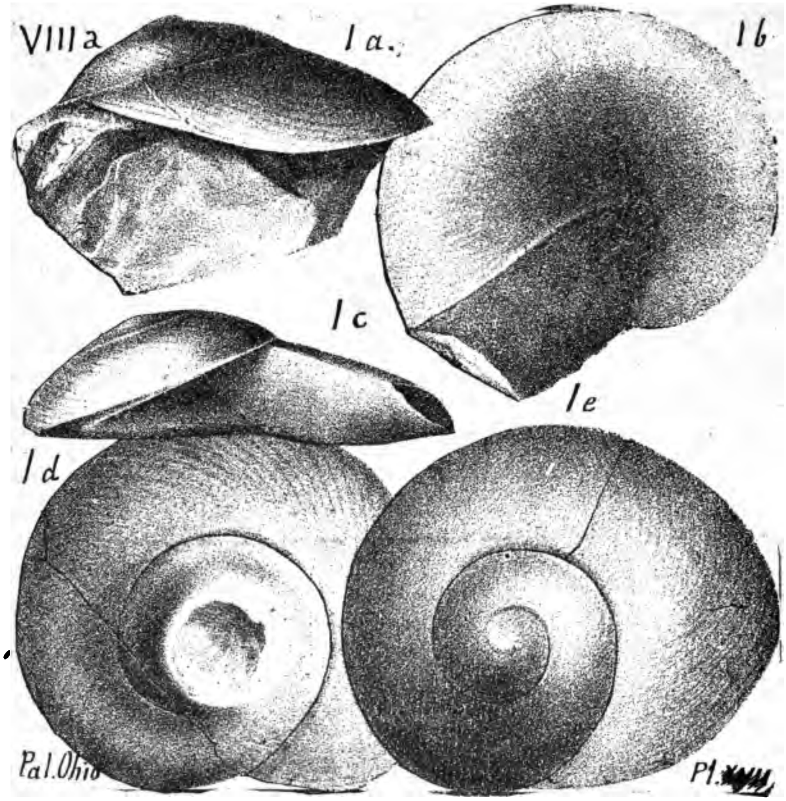


Fig. 949.

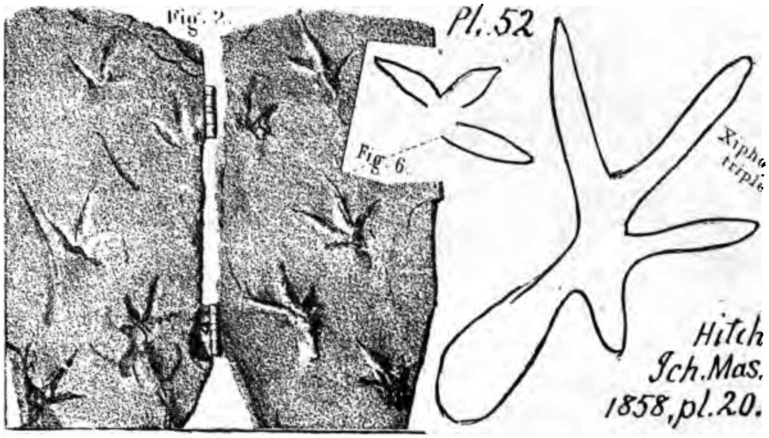
Xenonuera antiquorum. Scudder A devonian neuropterid insect's wing, found at St. John in New Brunswick; therefore far older than the large flies of the Coal measures. Canadian Nat. [2] Vol. 3, 1867, p. 206, fig. 5. Figure taken from Zittel's Handbuch, Vol. 2, 1885, p. 760, f. 949, *enlarged threefold.* — *VIII? IX?*

Xenophora ? antiqua. (*Trochita* **antiqua,** Meek. Proc.



Acad. Nat. Sci. Philada. 1871.) — Pal. Ohio, Vol. 1, 1873, page 221, plate 17, fig. 1*a*, *naturnl size*, profile of depressed spire and sharp edge; *b*. under side; *c*, profile of another specimen; *d*, upper side, very oblique costæ obscurely indicated on the cast; *e*, upper side of *a*. Species so peculiar that it cannot fail to be identified. Differs from its nearest genus *Xenophhora*, Fischer, (*Phorus*, Montfort) and also from the genus *Onustus*, Humphrey, in not having the habit of attaching foreign bodies around its edge, and in wanting the latter's distinct umbilicus. Might be named *Pseudophorus antiqus*. — Monclova, Lucas Co., O. *Corniferous limestone* (not *Waterlime*). *VIIIa.*

Xiphopeza triplex, track. Hitchcock. Ichthy. Mass. 1858, page 113, plate 20, fig. 6, outline of both feet; plate 52, fig. 2, ambrotype sketch of hinged slabs, showing how the prints passed down through successive thin layers of the muddy sand of the tidal estuary of the present Connecticut river valley. Hind foot, 4 toes and a heel; fore foot only 3 toes shown, but probably had four or five; track just in advance of hind foot track; body of animal no doubt comparatively wide, as the rows of footprints are more than two inches apart. *Trias.*

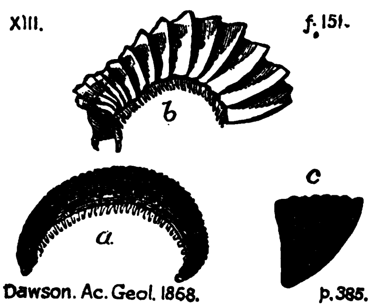


Xylobius dawsoni, Scudder; **X. fractus**, Scudder; **X. sigillariæ**, Dawson in part; **X. similis**, Scudder; all myriopods found in Sigillarian tree stump exposed in the great coal measure cliff of the South Joggins, Nova Scotia; three of them described in Mem. Bost. S. N. H. Vol. 2, p. 233, 234, 235, and 561, fig. 2, 3, 4; the fourth **X. sigillariæ** also in Quart. J.

Geol. S. Lond. Vol. 16, p. 268, 271, fig. 9, and afterwards renamed by Scudder **Archiulus xyloboides.** — *XIII.* (R. D. L. list.)

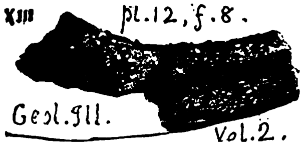
Xylobius mazonus, Scudder. Fig. 902 *b*, in Zittel's handbuch, (*magnified* to $\frac{3}{2}$ its natural size) found in a coal measure nodule on Mazon creek, Ill. — *XIII.*

Xylobius sigillariæ, Dawson. Acad. Geol. 1868, p. 385, f. 151, a worm or caterpiller, found as flattened impressions in the *pupa layer* of Nova Scotia Coal measures, "the oldest galley-worm known at the time of its discovery (1859), * * * haunting the decaying trunks of swamps and thus becoming in the hollow *Sigillaria* in which it was found." Since then other species of such myriopods have been found in European American coal measures. — See also fig. 902 *a* of Zittel's handbuch, on the same cut with 902 *b*, under *X. mazonus.* — *XIII.*

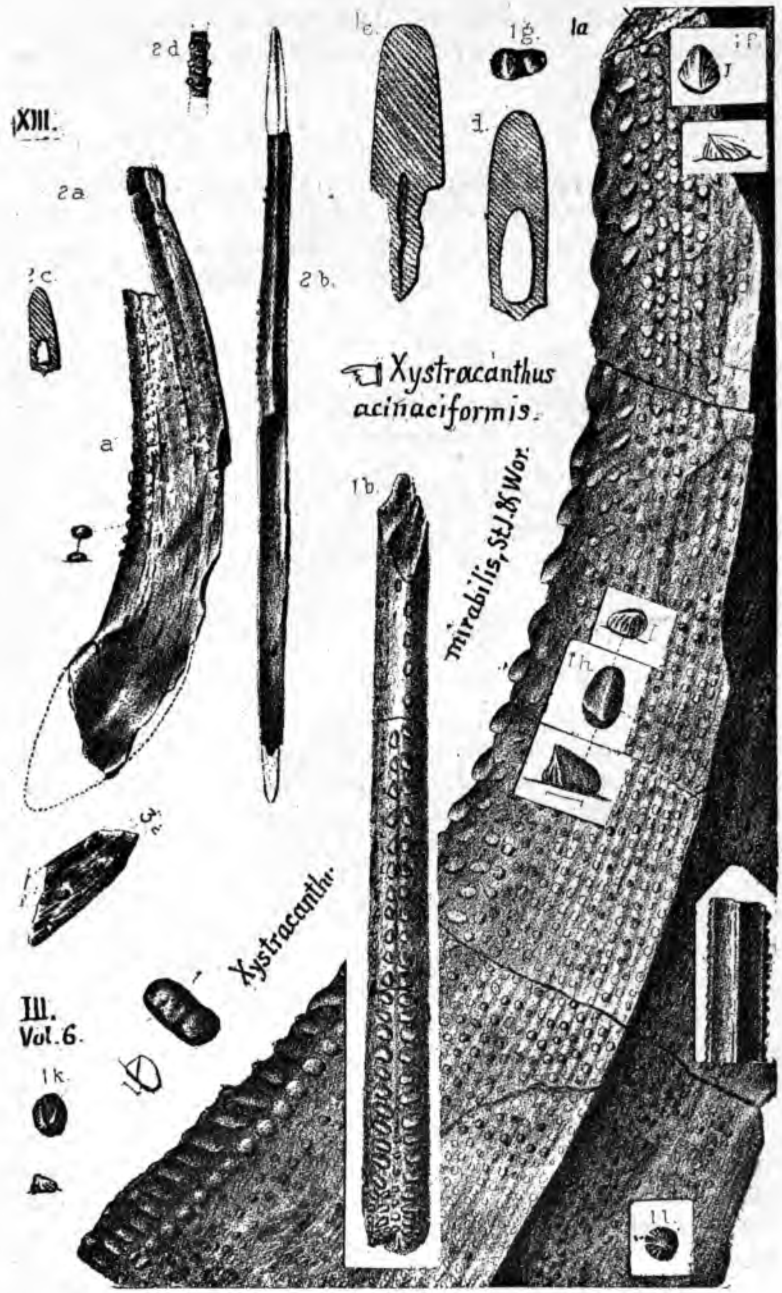


Xystracanthus acinaciformis, St. John & Worthen, Geo. Sur. Ill., Vol. 6, 1875, page 459, plate 19, figs. 2*a*. Side view of spine, natural size, with enlargements of tubercles; 2 *b*, view of posterior face; 2 *c*, transverse section near middle of spine; 2 *d*, portion of anterior margin showing arrangement of tubercles. *Coal No. 5;* Carlinville, Illinois. — Fig. 3, fragment of an undetermined spine, enlarged. *Middle Coal Measures;* Dallas county, Iowa. *XIII.* — *See fig. on page 1263.*

Xystracanthus (*Drepacanthus*) **anceps,** N. & W. Geology of Illinois, Vol. 2, 1866, page 122, plate 12, fig. 8, very close to *Oracanthus.* Springfield, Ill. *Coal measures. XIII.*

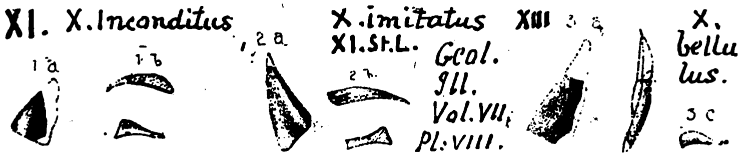


XIII
pl. 12, f. 8.
Geol. Ill.
Vol. 2.


XIII.
2d
2a
2c.
a
2b.
1c.
1g.
1a
1f.
1d.
Xystracanthus
acinaciformis.
1b.
mirabilis, St.J.& Wor.
1h.
3
Xystracanth
III.
Vol. 6.
1k.
1l.

Xystracanthus mirabilis; (*for figure see with X. acinaciformis,*) St. John & Worthen, Geo. Sur. Ill., Vol. 6, 1875, page 458, plate 20, figs. 1*a*, side view, natural size; 1 *b*, view from front showing disposition of tubercles along the anterior margin, reduced to one-fourth natural size; 1*c*, portion of posterior face, reduced to one-fourth natural size; 1 *d*, transverse section in upper part of the spine, partially restored; 1 *e*, similar section near base, showing the walls of the pulp-cavity distorted by pressure; 1 *f–l*, various views of tubercles, enlarged; 1 *f*, tubercle from one of the middle rows near the top of spine; 1 g, from the third row near top; 1 *h*, large tubercle from one of the anterior rows in middle of the spine; 1 *i*, large transverse tubercle near base; 1 *k*, *l*, small tubercles of middle rows near base. *Coal No. 4 or 5*, Fulton county, Illinois.—*XIII.*

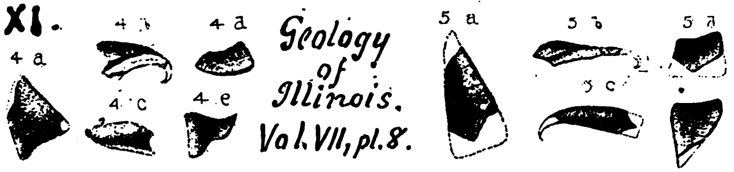
Xystrodus bellulus, St. John & Worthen, Geo. Sur. Ill., Vol. 7, 1883, page 183, plate 8, figs. 3*a*, maxillary left back tooth, seen from above; *b*, front side edge; *c*, cross section; crown beautifully marked by minute punctæ, each a minute cone surrounded by a slightly raised rim, and grouped into grooves. A unique specimen from the roof of coal bed 7, Danville, Ill. *Lower Coal measures. XIII.*



Xystrodus imitatus; (*See figs. with X. bellulus.*) St. John & Worthen, Geo. Sur. Ill., Vol. 7, 1883, page 180, plate 8, figs. 2*a*, maxillary back right tooth, from above; *b*, front-side edge; *c*, cross section. Surface minutely and densely punctate in regular cross rows; broader and smaller than the *Chester X. verus;* very like *X, striatus*, Agassiz, of the Irish *Mountain limestone.* Several places of *St. Louis limestone. XI.*

Xystrodus inconditus, (*See figs. with X. bellulus.*) St. John & Worthen, Geo. Sur. Ill., Vol. 7, 1883, page 179, plate 8, figs. 1*a*. Left back maxillary tooth, seen from above; *b*, edge; *c*, section. Several places on the *Keokuk limestone. XI.*

Xystrodus simplex, St. John & Worthen, Geo. Sur. Ill.,


XI.
4 b
4 a
4 a
4 c
4 e
Geology of Illinois. Vol. VII, pl. 8.
5 a
5 b
5 a
5 c

Vol. 7, 1883, page 178, plate 8, figs. 4*a*, *b*, *c*, *d*, *e*, left back mandibular tooth; 5*a*, *b*, *c*, *d*, *e*, right back maxillary tooth. Various places in *Upper Burlington limestone fish bed*. *XI*.

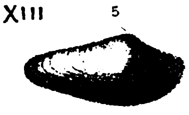
Xystrodus verus, St. John & Worthen. Geo. Sur. Ill.,

XI.
Ch.
L
6 b
7 b
7 a
6 c
Geol. Ill. Vol. VII, pl. 8.
7 c

Vol. 7, 1883, page 181, plate 8, figs. 6*a*. Left back upper tooth, from above; *b*, front side edge; *c*, cross inner edge; 7*a*, left back jaw tooth; *b*, front side edge; *c* back-side edge; *d* cross profile of inner edge. Chester, Ill. *Chester limestone*. *XI*.

Yoldia a mistake for **Ptychopteria** in Randall's catalogue of collections at Warren, Pa., specimen, 9499, 9622.

Yoldia carbonaria, Meek, Regents' Report University of Virginia, 1871. — Pal. Ohio, Vol. 2, 1875, page 336, plate 19, fig. 5, view of right valve; hinge and interior unknown; has the external characters of some species of *Palæoneilo*. Monongahela Co., W. Va., in dark shale just below the *Mahoning sandstone*., i. e., over *Freeport upper coal*. *XIII*. — Also in the *Black fossiliferous limestone* of the Barren measures, 250′ beneath the Pittsburgh coal. (L, 35.) *XIV*.

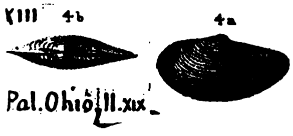


Yoldia knoxensis, (*Leda Knoxensis*, McChesney. Expl. Pal. Foss. 1865. *Coal measures*.) — In S. W. Pennsylvania also (K3, 310). *XIII*.

Y. (*Leda*) **levistriata**, Meek and Wor., 1

Y. (*Leda*) **oweni**, McChesney, 1865. *X*

Y. (*Leda*) **rushensis**, McChesney, 1865. *XIII.*



Yoldia stevensoni, Meek. Regents' Report, University of Virginia 1871. — Pal. Ohio, Vol. 2, 1875, page 335. plate 19, fig. 4*a*, *natural size*, left valve, showing the very regular fine striæ over the surface; *b*, dorsal view of the same; a very neat, remarkably compressed species; but hinge and interior unknown. Monongahela Co., W. Va., black shale over *Freeport upper coal* (K3, 910). *XIII.*

Y. (*Leda*) **subscitula**, Meek and Hay, 1858. *XVIII.*

Y. valvulus, Hall and Whit., 1872. *VIII. a.*

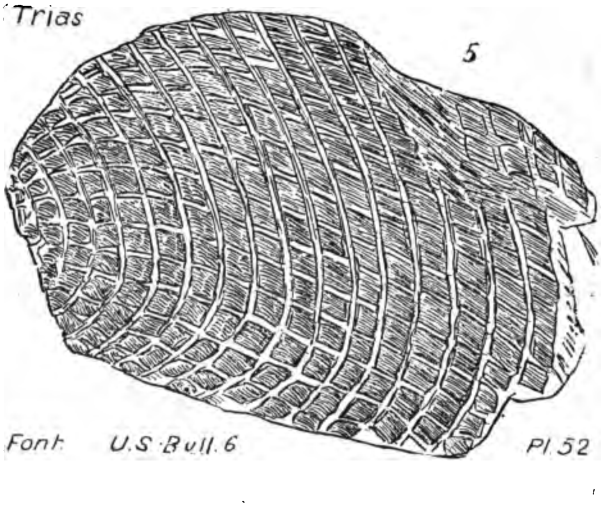
Zacanthoides flagricaudatus, Walcott. (*Olenoides flagricaudatus*, White sp.) near to *Dorypyge.* Amer. Jour. Sc. Sept., 1888, p. 165. — *Middle Cambrian. M. C.*

Zacanthoides levis, Walcott. (*Olenoides levis*, Walcott,) near *Dorypyge.* Am. J. S. Sept., 1888, p. 165. — *M. C.*

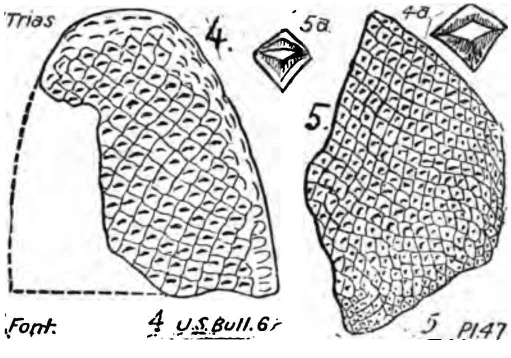
Zacanthoides typicalis, Walcott. (*Olenoides typicalis*, Walcott, Am. J. S, Sept., 1888, p. 165, from N. Alabama, many specimens. (MS. Letter Dec., 1888.) — *M. C.*

Zacanthoides spinosus, Walcott, 1886, (*Embolimus spinosa*, Rominger, 1887.) A Rocky Mountain trilobite, strongly marked. Am. J. S. Sept., 1888, p. 165. — *M. C.*

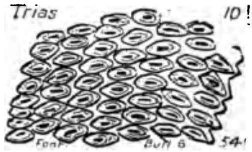
Zamiostrobus emmonsi, Fontaine, in Geol. Sur. U.S. Mon. 6, p. 117, plate 52, fig. 5, not the trunk of a Cycad, although cylindrical casts of Cycad trunks were found with it. Emmons, Amer. Geol. fig. 92*a*, North Carolina. *Trias.*



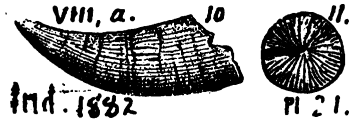
Zamiostrobus virginiensis, Font. Monog. U. S. Geol. Survey, Vol. 6, page 85, plate 47, figs. 4, 5, different shaped cones; 4*a*, 5*a* *magnified* scars. Found only at the Gowry shaft, Va., and with impressions of *Podozamites tenuistriatus*, to which the cones may belong. — *Trias.* (*Rhætic ?*)



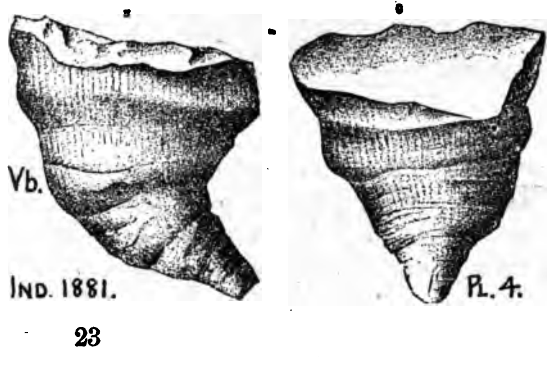
Zamiostrobus —— ? Emmons. Amer. Geology, fig. 93.— Fontaine in Monog. U. S. Geol. Survey, Vol. 6, 1883, p. 117, plate 54, fig. 10; casts of tree trunks thus marked ("of course not those of *Lepidodendron*, as this plant does not exists in the Mesozoic," Fontaine) are not common. The specimen figured was found as a cast embedded in the *Lockville* (N. C.) *conglomerate*, 6 or 8 inches long, with a small branch proceeding from it. (Emmons). — *Trias.*



Zaphrentis calcariformis. (Hall, 35th An. Rt. N. Y. State Mus. 1882.) Collett's Indiana Rt. 1882, page 293, plate 21, fig. 10, side; fig. 11, calyx. *Corniferous limestone* Numerous at the Falls of the Ohio. *VIII a.*

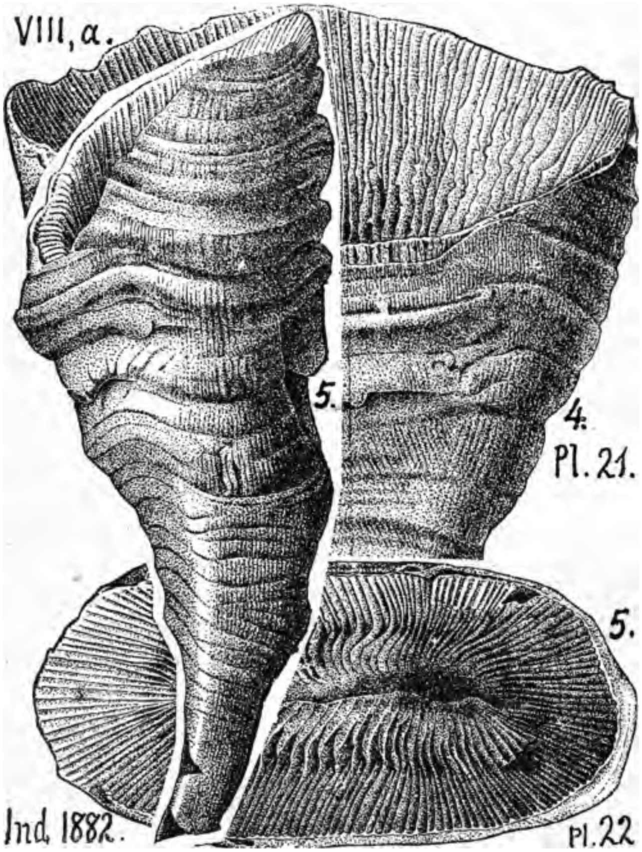


Zaphrentis celator. Hall, in Collett's Indiana Report of 1881, page 227, plate 4, fig. 5, 6. (28th Report N. Y. St. Museum, 1876, 1879.)— Calyx, deep as wide; septa 60, or more. Species rare at Waldron. *Niagara.*

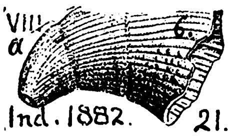

Vb.
IND. 1881.
PL. 4.

Zaphrentis colletti. (Hall, 35th An. Rt. N. Y. St. Mus. 1882). Collett's Ind. Rt. 1882, page 315, plate 18, fig. 12, cup or calyx showing strong lamellæ; fig. 13, side of the coral. Crab Orchard, Ky. *Corniferous. VIII a.— For figure, see top of page 1269.*

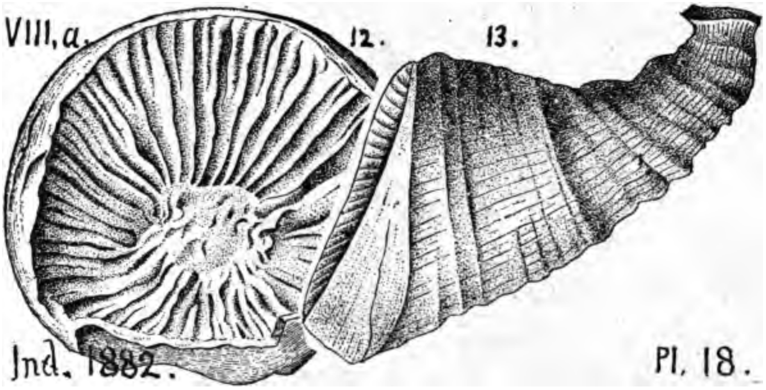
Zaphrentis compressa. (Röminger, Foss. Corals, 1876, p. 153, plate 53.) Collett's Indiana Rt. of 1882, page 295, plate 21, fig. 4, back of coral, showing calyx; fig. 5, calyx of same; plate 22, fig. 5, side of same specimen. It closely resembles *Z. ungula*, but it is much larger, &c.— Falls of the Ohio. *Corniferous VIII a.*


VIII, a.
5.
4.
Pl. 21.
5.
Ind. 1882.
Pl. 22.

Zaphrentis concava. (Hall's 35th An. Rt. N. Y. State Museum, 1882). Collett's Indiana Rt. 1882, page 291, plate 21, fig. 6. Falls of the Ohio river. *Corniferous limestone. VIIIa.*

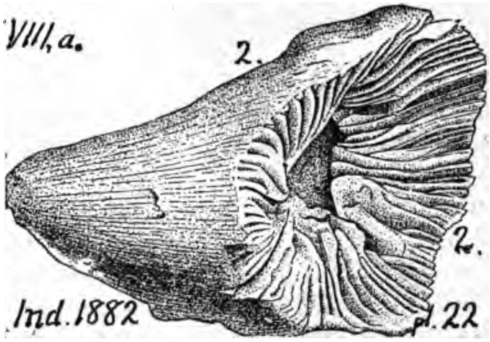


Zaphrentis colletti. *See page 1268.*



Zaphrentis conigera. See **Clisiophyllum conigerum.**

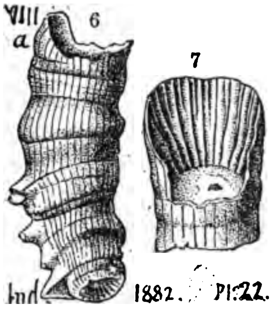
Zaphrentis convoluta. (Hall's 35th An. Rt. N. Y. State Mus. 1882). Collett's Ind. Rt. 1882, page 296, plate 22, fig. 2, easily distinguished from the other corals by the conspicuous coming together into bundles of the lamellæ and their twisted appearance. Falls of the Ohio. *VIII a.*



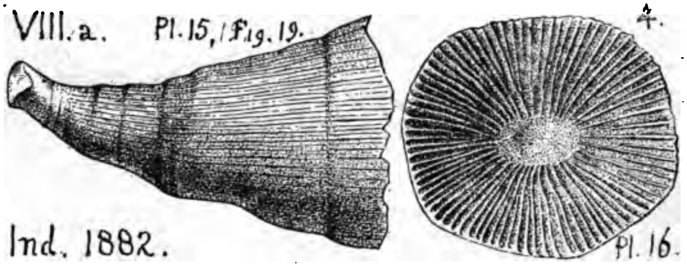
Zaphrentis cornicula. **Heliophyllum corniculum.** *VIIIa.*

Zaphrentis corticata; like **Streptelasma inflatum.**

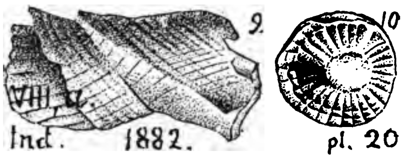
Zaphrentis (Amplexus?) cruciformis. (Hall's 35th Annual Report of the N. Y. State Museum of Natural History, 1882.) Collett's Indiana Report of 1882, page 315, plate 22, figs. 6, side; fig. 7, broken back wall of the calyx gives a view into it. Falls of the Ohio. *Corniferous limestone. VIII a.*



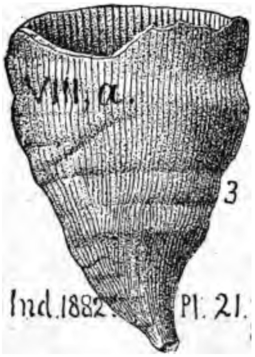
Zaphrentis cyathiformis. (Hall's 35th An. Rt. N. Y. State Mus. 1882.) Collett's 1882. Falls of Ohio. *VIII a.*


VIII. a.
Pl. 15, Fig. 19.
4.
Ind. 1882.
Pl. 16.

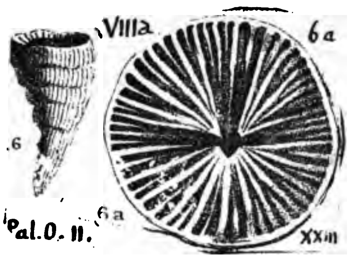
Zaphrentis deformis. (Hall's 35th An. Rt. N. Y. State Museum.) Collett's Indiana Report, 1882, page 290, plate 20, fig. 9, 10, side and cup of oblique growth-rings, and few lamellæ. *VIII a.*



Zaphrentis duplicata. (Hall's 35th An. Rt. N. Y. State Musuem, 1882.) Collett's Indiana Report for 1882, page 293, plate 21, fig. 3, back side of the coral, which can be distinguished from *Zaphrentis frequentata* by its finer plates (lamellæ), thickened and coalesced at the center, and by its narrow fossette. — Falls of the Ohio. *Corniferous limestone VIII a.*

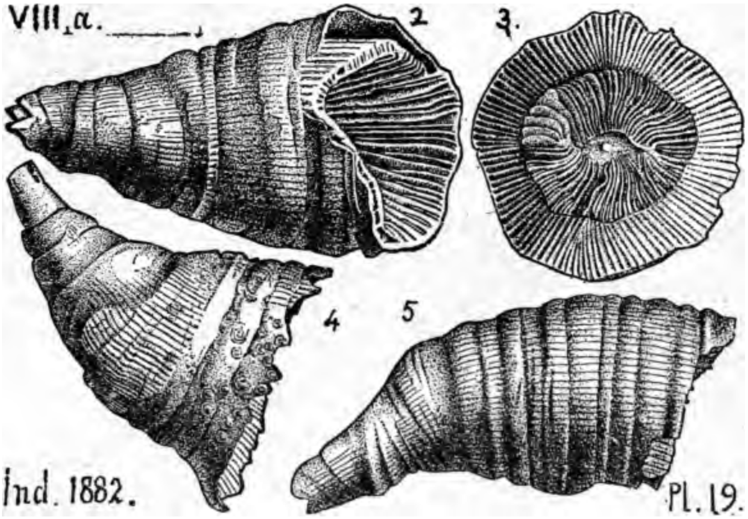

VIII, a.
3
Ind. 1882
Pl. 21.

Zaphrentis edwardsi, Nicholson, Pal. Ohio, Vol. 2, 1875, plate 23, page 235, fig. 6, side view, ***natural size***, *6a*, ***greatly enlarged*** cup (calyx); differs from all other known species, except *Z. griffithi*, E. and H. in having two side little ditches (fossulæ) at right angles with the deep main furrow (fossule) which goes down to the center of the visceral cham-

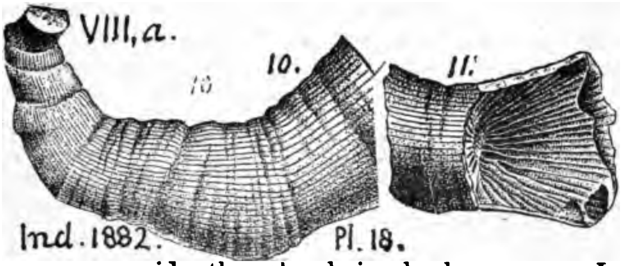


ber; but *Z. griffithi* is larger, narrower and has a deeper cup and fewer septa. Columbus, O. *Corniferous limestone. VIII a.*

Zaphrentis elegans. (Hall's 35th An. Rt. N. Y. S. Mus.)

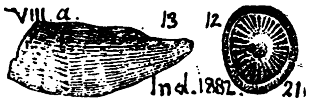


Collett's Ind. Rt. 1882, page 287, plate 19, fig. 2, back view partly into the cup; fig. 3, cup of another specimen; figs. 4, 5, sides of two specimens. Distinguished from *Z. profunda* by its compressed form, shallower cup, and finer plates; and from *Z. nitida*, in a similar way. — Falls of the Ohio. *Corniferous limestone. VIII a.*

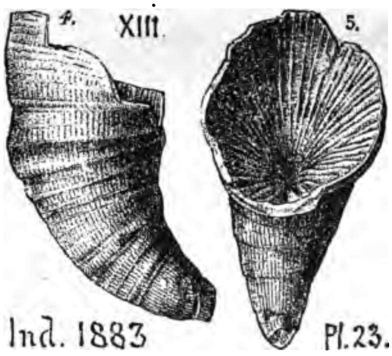

VIII,a.
10.
10
11.
Ind. 1882.
Pl. 18.

Zaphrentis foliata. (Hall's 35th An. Rt. 1882.) Collett's Ind. Rt. 1882, page 286, plate 18, fig. 10, side; fig. 11, part of upper end, showing rays of the cup on one side, the other being broken away. In a cross section it seems made up of numerous thin laminæ sheathed in one another, and in this resembles *Cyathophyllum exfoliatum*, a coarser, stronger coral than this one. Falls of the Ohio. *Corniferous limestone. VIII a.*

Zaprhentis fusiformis. (Hall's 35th An. Rt. N. Y. State Mus. 1882.) Collett's Indiana Rt. 1882, page 296, plate 21, fig. 12, 13, cup and side. Easily known by its small size, pinched cup, and peculiar center. — Louisville, Ky. *Corniferous limestone*, *VIII a.*

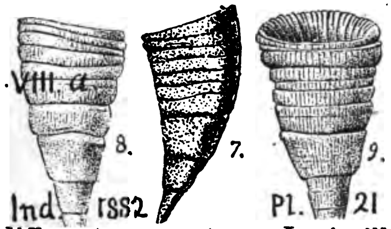


Zaphrentis gibsoni. White. Collett's Indiana Geological Report of 1882, page 117, plate 23, figs. 4, side view of the coral, *natural size;* fig. 5, another view of the same specimen showing the cup or calyx, with its 36 to 40 partitions (septa) prominent and thin. This typical *Zaphrentis* is the only species known to have lived in the age of the Coal measures, although there had been enough species living in the previous subcarboniferous age. It resembles the subcarb. *Zaph. spinulifera*, Hall, but is without spines and has a deeper cup. Vermillion county, Ind. *Upper coal measures. XV.* — *Note.* These figures were accidentally used for *Axophyllum rude*, on page 79 of this Dictionary, Vol. I.

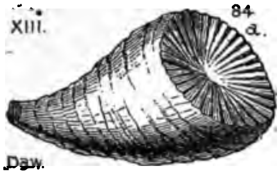


Zaphrentis gigantea, Rafinesque. 1820. Edwards and Haime, Polyp. Foss. 1831. *Corniferous.* — In Pike and Monroe Cos., Pa., at the heads of Sawkill, Raameskill, Dingman's and Middle Bushkill falls (a famous locality for collecting corals, G6, 109), in what White recognizes as the *Tully limestone. VIII a; VIII d.*

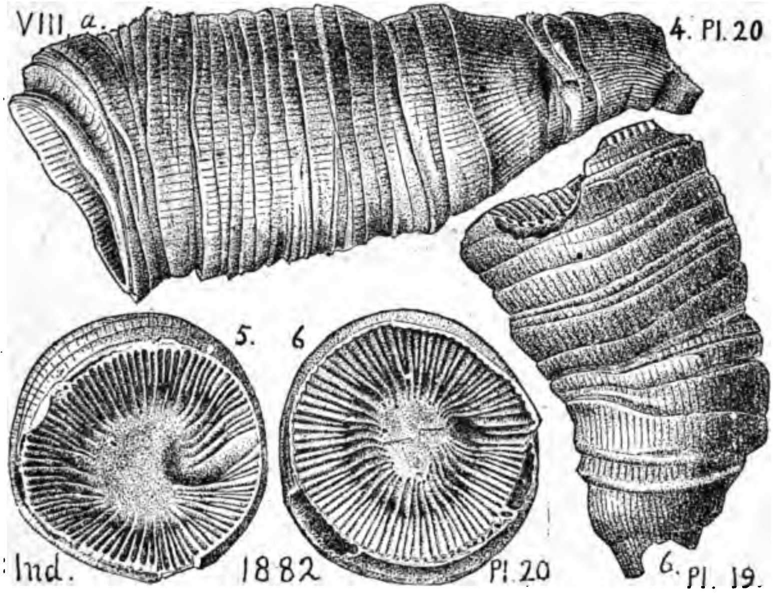
Zaphrentis herzeri. (Hall's 35th An. Rt. N. Y. State Museum.) Collett's Indiana Rt. of 1882, page 292, plate 21, fig. 7, 8, 9, side, front and back view. It is not Röminger's Michigan *Heliophyllum exiguum;* and is less pinched than *Zaph. ungula* and has a different cup-center. — Louisville, Ky. *Corniferous. VIII a.*



Zaphrentis minas, Dawson. Acad. Geol. 1868, p. 287, fig. 84; with 32 septa; largest specimen more than 2 inches long; top sometimes contracted; found at various places in Nova Scotia, in *Carboniferous limestone*, *XIII.*

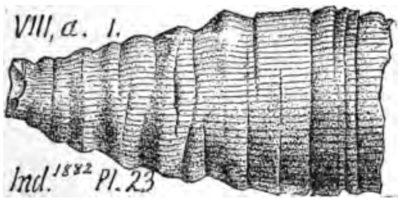


Zaphrentis nitida. (Hall's 25th An. Rt. N. Y. State Mus).

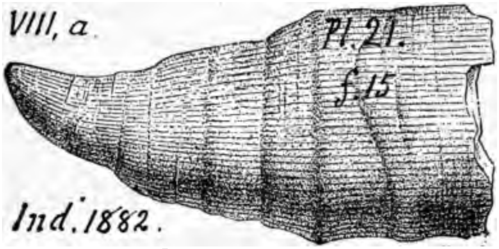


Collett's Indiana Rt. 1882, page 288, plate 19, fig. 6, side view; plate 20, figs. 4, 5, side and cup; fig. 6, another cup. Resembles most nearly *Zaph profunda*, but is solider, and shallower in cup. Falls of the Ohio. *Corniferous limestone*, *VIII a.*

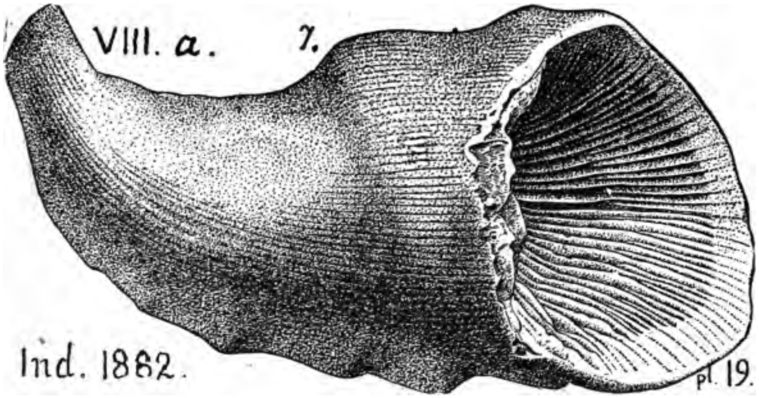
Zaphrentis ovalis. Hall's 35th An. Rt. N. Y. State Mus. 1882.) Collett's Indiana Rt. 1882, page 295, plate 23, fig. 1; cup with 75 uniform lamellæ, &c. — Falls of the Ohio. *Corniferous limestone*, *VIII a.*



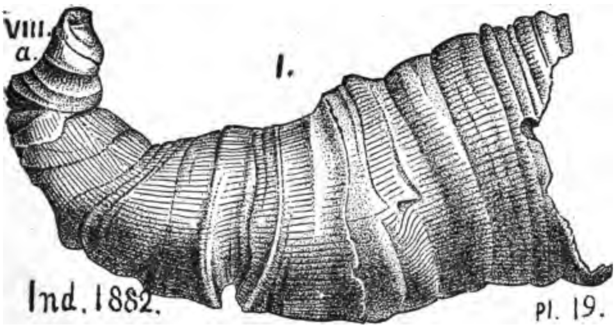
Zaphrentis phrygia. **Heliophyllum corniculum.** *VIII a.*


VIII, a
Pl. 21.
f. 15
Ind. 1882.

Zaphrentis planima. (Hall's 35th An. Rt. N. Y. State Museum.) In Collett's Ind. Rt. 1882, page 292, plate 21, fig. 15, with 85 to 90 lamellæ, of nearly uniform thickness, &c., &c. — Falls of the Ohio. — *Corniferous limestone. VIII a*


VIII. a.
7.
Ind. 1882.
Pl. 19.

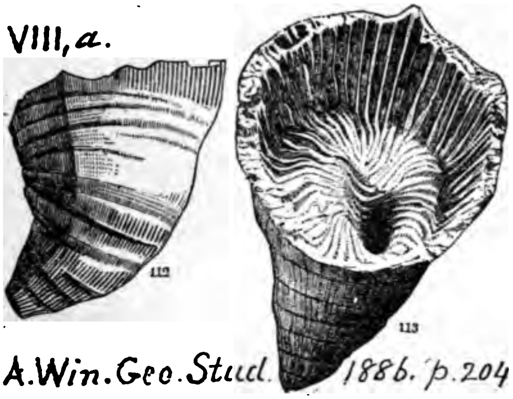
Zaphrentis ponderosa. (Hall's 35th An. Rt.) In Collett's Ind. Rt. 1882, page 288, plate 19, fig. 7, with 90 lamellæ, &c. back view looking into the calyx; specimen slightly twisted in its growth. Falls of the Ohio. *Corniferous limestone*, *VIII a*·


VIII. a.
1.
Ind. 1882.
Pl. 19.

Zaphrentis profunda. (Hall's 35th An. Rt. N. Y. State Mus.) Collett's Ind. Rt. 1882, page 287, plate 19, fig. 1, side view. Has from 100 to 110 lamillæ, alternating in size, thin and sharp below; etc. — Falls of the Ohio. *Corniferous limestone. VIII a.*

Zaphrentis prolifica. (Billings Canad. Nat. and Geol. 1859, Vol. 4, Corn. L.) A.Winchell's Geolog. Studies, 1886, page 204, figs. 112, 113. In *Corniferous limestone.* (Other figures are given in Logan's Geology of Canada, page 365, figs. 360 *a, b., for which see top of next page,* 1276.—*VIII a.*

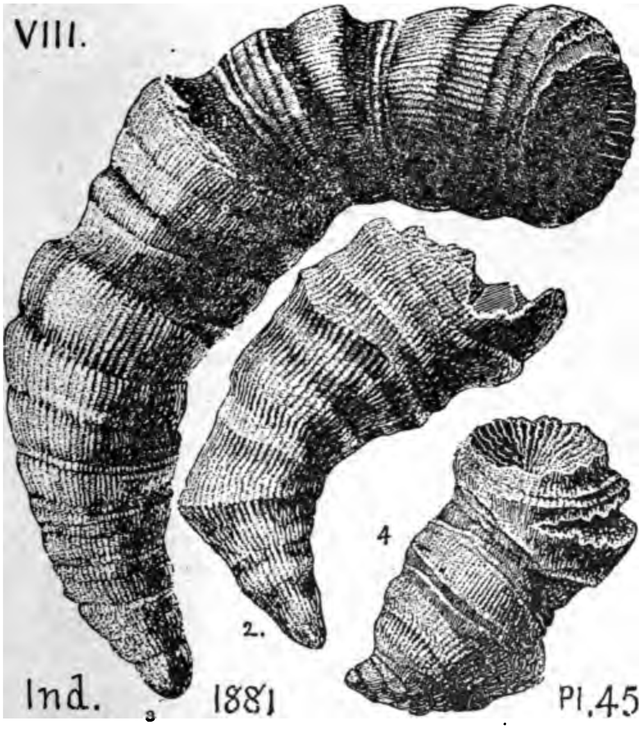
VIII, a.



A.Win.Geo.Stud. 1886. p.204

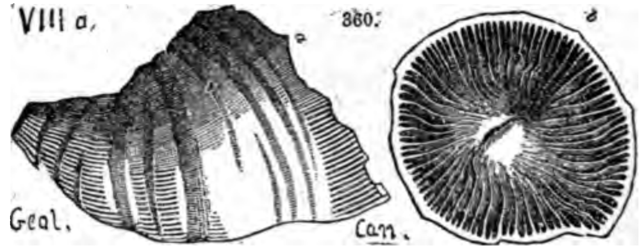
Zaphrentis raphinesquii. Edwards & Haime. (Type obtained near Jeffersonville Ind.) Collett's Indiana Report of 1881, page 393, plate 45, fig. 2, an adult polyp; fig. 3, a shorter specimen; fig. 4, another with a broken calyx. Seen at various Devonian outcrops in Indiana.—In PikeCo., Pennsylvania, at the heads of the Sawkill, Raameskill, Dingman's, and Middle Bushkill falls (a fine coral exposure,

VIII.



Ind. 1881 Pl.45

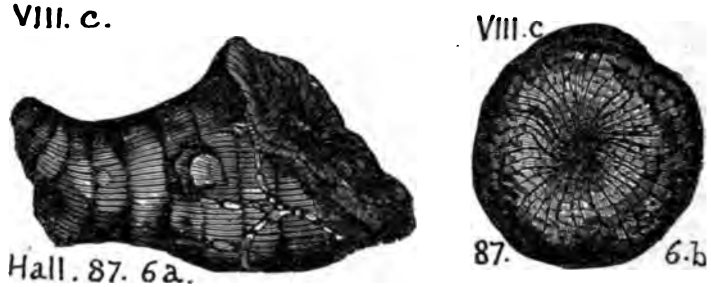
Zaphrentis prolifica. See last page, 1275.



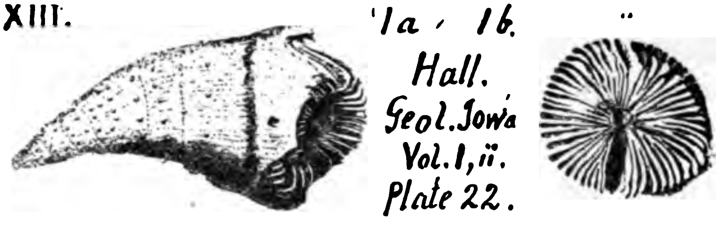
Zaphrentis raphinesquii continued.

G6, 109) in the *Tully limestone.* — In Monroe Co., especially at Stroudsburg (G6, 121) in the *Corniferous limestone. VIII a; VIII d.*

Zaphrentis simplex. (*Strombodes simplex.*) Hall, Geology of the Fourth District, N. Y., 1843, page 209, fig. 87, 6. *Hamilton.* (Resembles, but differs from, **Strombodes plicatum.**) *VIII c.*



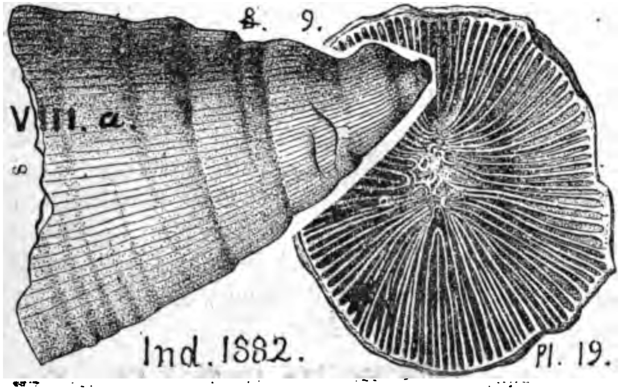
Zaphrentis spinulifera, Hall, Geol. Sur. Iowa, 1858, Vol. 1 part 2, page 650, plate 22, figs. 1*a*. Side view of specimen of medium size; 1*b*, view of the calyx and its rays, numbering at the edge from 42 to 50, and uniting in bundles of 2, 3, 4, or


XIII.
1a / 1b.
Hall.
Geol. Iowa
Vol. 1, ii.
Plate 22.

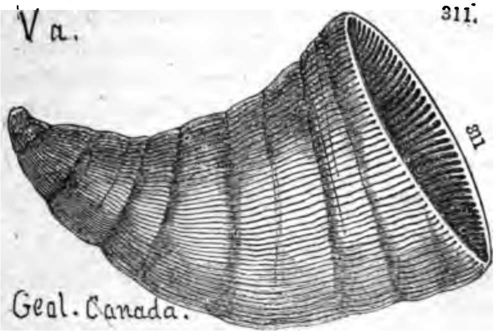
more before reaching the center. It differs from *Z. spinulosa*, Edward & Haime, which also has short external spines on the outside surface. Is allied to *Z. dalii*, E. & H., which is equally common with it in the *Warsaw limestone*; but not so clearly distinct from a *Keokuk limestone* species. Comp. the similar *Z. gibsoni.* — Stevenson has *Z. spinosus* in his list of *Lower carboniferous* fossils of S. W. Pennsylvania. (K3, p. 311.) — *Warsaw* (*Second Archimedes ; subcarboniferous*) *limestone*, at Warsaw, Ill. *XI.*

Z. spinulosa, Ed. and Haime, 1851, *Kask. XI.*

Zaphrentis spissa. (Hall's 35th An. Rt. N. Y. State Mus.) Collett's Indiana Rt. of 1882, page 289, plate 19, figs. 8, 9, side and cup of a coral; 110 laminæ, etc. Falls of the Ohio. *Corniferous limestone. VIII a.*


8. 9.
VIII. a.
8
Ind. 1882.
Pl. 19.

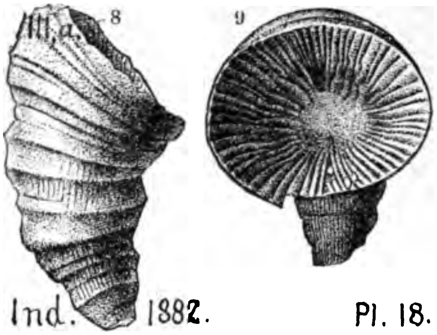
Zaphrentis stokesii, Edwards and Haime. Pal. Foss. Ter. Palœozoiques. — Logan's Geol. of Canada, page 308, fig. 311, from the *Anticosti group* (*Clinton formation. Va?*)



Z. subrecta, Billings, 1875. *VIII a.*

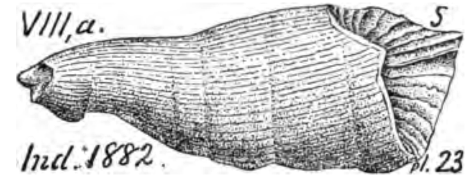
Z. subvada, Hall. 1882. *Niagara, V b.*

Z. subvesicularis, Hall., 1882. *Niagara, V b.*

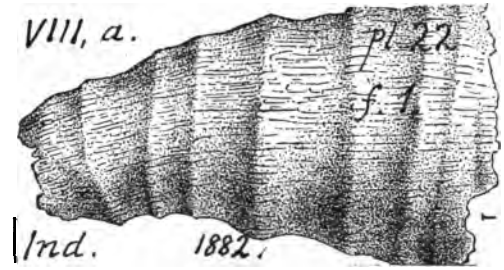

VIII, a.
8
9
Ind. 1882.
Pl. 18.

Zaphrentis subcompressa. (Hall's 35th An. Rt. N. Y. State Museum, 1882.) Collett's Indiana Rt. 1882, page 286, plate 18, figs. 8, 9, side and cup of a coral of about 60 lamellæ, somewhat like *Zaph. corrugata*, but lamellæ thicker at the cup's lip, &c., &c. — Falls of the Ohio. *Corniferous limestone. VIIIa.*

Z. tabulata, Hall, 35th Rt., 1882. *VIII a.*


VIII, a.
5
Ind. 1882.
pl. 23

Zaphrentis terebrata. (Hall's 35th An. Rt. N. Y. State Mus.) Collett's Ind. Rt. 1882, page 316, plate 23, fig. 5, side view of coral of 50 strong lamellæ, and 50 rudimentary ones; differing from *Zaph. ovalis* in a much smoother surface, narrow deep cup, &c. — Falls of Ohio. *Corniferous limestone. VIII a.*


VIII, a.
pl. 22
f. 1
Ind. 1882.

Zaphrentis torta. (Hall's 35th An. Rt. N. Y. State Museum.) Collett's Ind. Rt. 1882, page 285, plate 22, fig. 1, with 75 alternating lamellæ. — Falls of Ohio, and Clarke Co., Ind. *Corniferous limestone, VIII a.*

Z. transversa, Hall, 35th Rt. *VIII a.*

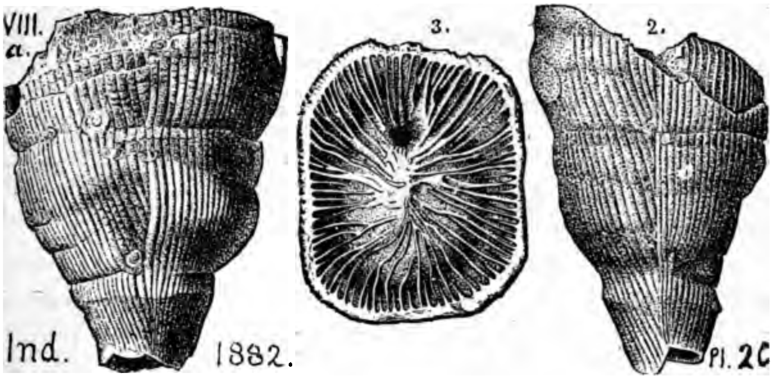
Z. transversenis, Winchell, Report of Lower Peninsula of Michigan.

Z. (*Polydilasma*) **turbinata,** Hall. *VIII b.*

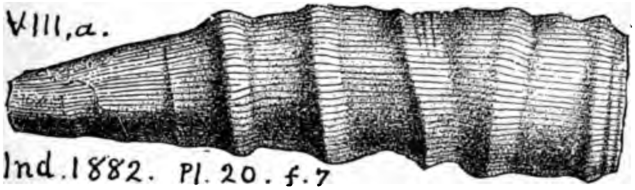
Z. ulrichi, Worthen, Geol. Ill., Vol. 8. *XI.*

Z. umbonata, Rom. Foss. Cor., 1876. *VIII c.*

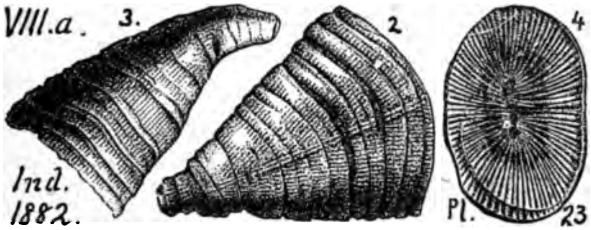
Zaphrentis trisutara. (Hall's 35th An. Rt. N. Y. State Mus.) Collett's Ind. Rt. 1882, page 289, plate 20, fig. 1, front. fig. 2, left side, fig. 3, cup, of curious square form, with bundled lamellæ and deep fossette, easily distinguished.—Falls of the Ohio. *VIII a.*



Zaphrentis undata. (Hall's 35th An. Rt.) Collett's Ind. Rt. of 1882, page 291, plate 20, fig. 7, side of a small specimen. [I omit fig. 8, side of a larger specimen, and plate 25, fig. 1, section lengthwise.] Hard to tell it by the outside from *Heliophyllum annulatum;* but its inside structure is entirely different.—Falls of Ohio and Clarke county, Ind. *Cornif.* *VIII a.*



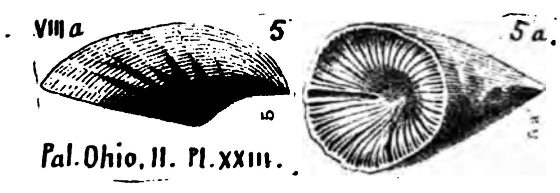
Zaphrentis ungula. Hall's 35th An. Rt. to N. Y. State Museum.—Collett's Indiana Rept. of 1882, page 296, plate 23, figs. 2, 3, 4, front, side and cup of a specimen larger than ordinary.—Falls of the Ohio, both sides. *Corniferous limestone.* *VIII a.*



Z. varsoviensis, Worthen, Geol. Ill., Vol. 8. *Keokuk-limestone. XI.*

Z. venusta, Hall, Foss. Cor. Niag., 1882; 35 Rt. N. Y. State Mus. *Up. Held. VIII a.*

Zaphrentis wortheni, Nicholson. Pal. Ohio, Vol. 2, 1875, page 235, plate 23, fig. 5, *natural size*, side view, showing the extreme obliquity of the calyx; *a* front view; 88 septa, half of them large and reaching nearly to the bottom of the cup; species easily distinguished by its obliquity, its narrow fossule on the convex side of the corallum, its small size, number of septa, and absence of yearly growth swellings. Sanders, Ky. and O. *Corniferous. VIII a.*



Zaphrentis (Caninia) in *Clinton fossil ore* bed, shale partings, Bedford Co., Pa. Wolfsburg mines (T2, 144). — *V a.*

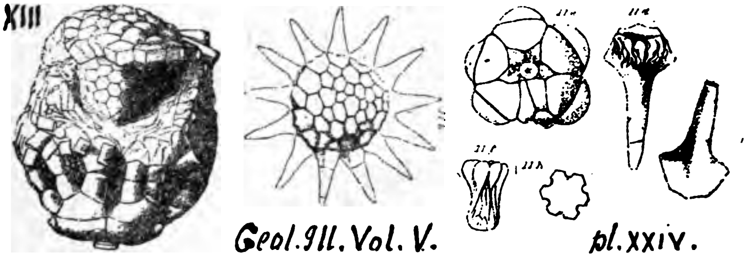
Zaphrentis abundant in *Lower Helderberg* bottom beds, 260′ beneath the *Oriskany*, in Huntingdon Co., at Orbisonia; also in Weaver's Run section (T, 41; T3, 126, 156); especially numerous in the McConnellstown limestone cliffs (T3, 201); 30′ beneath the top of *VI*, in the coral beds of Powell's quarry, Cove station (T3, 123); occurs among the masses of *Stromatopora* in cliff near Juniata Sand Co.'s quarry on Mill creek (T3, 269). — In Bedford Co. on weathered surfaces, Napier township (T2, 121); in upper Cherty beds, Beaver Dam run, King township (134); Cherty beds, 100′ beneath *Oriskany*, at Bedford (149); abundant near State line, Martin's ridge (159); the above called *Caninia* (T2, 83). — In Center Co. (T4, 430). — In Northumberland Co., in *Stormville limestone* or *Stromatopora bed* (G7, 300, 348); also in Montour Co. (247, 261). — *VI.*

Zaphrentis, a small species, in *Corniferous* (White's *Selinsgrove lower* or *Marcellus*) *limestone*, at Selinsgrove, Northumberland Co. (G7, 79, 82, 360). — *VIII a.*

Zaphrentis, a small species, in *Tully* limestone, in the cut 3½ miles east of Northumberland, and also at South Danville (G7, 339, 352). — *VIII d.*

Zeacrinus (*Hydreionocrinus ?*) **acanthophorus.** Meek &

XIII

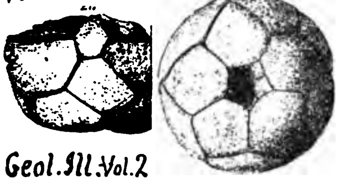


Geol.Ill.Vol.V. pl.XXIV.

Worthen Proc. Acad. Nat. Sci. Phil. 1870, M. & W., Geo. Sur. Ill., Vol. 5, 1873, page 563, plate 24, figs. 11*a* to 11*h*; form of body and arrangement of anal pieces very like *Z. discus* of *Upper coal measures;* from *Z. mucrospinus* distinguished by absence of spines on second ray pieces, &c. Seaville, Ill., roof of Coal No. 1. *Lower coal measures. XIII.*

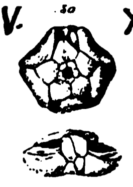
Zeacrinus ? crassus. (*Cyathocrinus crassus*, Meek and

XIII Z.crassus



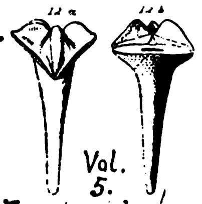
Geol.Ill.Vol.2

XV.



Z.discus.

XV.



Vol. 5.

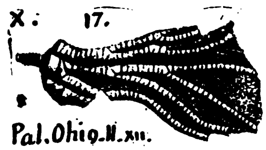
Z.mucrospinus.

Worthen, Proc. Acad. Nat. Sci. Phil. 1860) M. & W., Geo. Sur. Ill., Vol. 2, 1866, page 314, plate 26, figs. 2*a*, 2*b*. View of body from behind, up to the top of the second radial pieces; *b*, under side, closely related to *Hydreionocrinus*, De Koninck's genus (Mem. Pal. Bull. A. R. Belgique, III, p. 22.) Illinois *lower coal measures. XIII.*

Zeacrinus discuss. Meek and Worthen, Proc. Acad. Nat. Sci. Phil. 1860, M. & W., Geo. Sur. Ill., Vol. 2, 1866, page 312, plate 26, figs. 3*a*, 3*b*, (*see under Z. crassus above,*) under side of body; hind view of same to top of first radials. Allied to *Cupressocrinus impressus*, McCoy. (British Pal Foss. III D, 2.) The long spires of McChesney's *Z. mucrospinus* (New Spec. Pal. Foss. IV, 7,) not yet seen. Illinois *Upper Coal measures. XV.*

Zeacrinus mucrospinus, McChesney, New Pal. Foss. 1860, M. & W., Geo. Sur. Ill., Vol. 5, 1873, page 563, plate 24, figs. 12*a*, 12*b* (*see under Z. crassus above*); found at Springfield, Ill., in the roof shales of *Coal No 8*, *Upper coal measures? XV?* —In Western Pennsylvania Beaver, Lawrence, Mercer, Butler Cos. abounds in the *Ferriferous limestone* of the Allegheny river coal series (Q, 62; Q2, 47, 106; Q3, 25; V, 147). — In Greene Co., seen in Stevenson's *Decker Creek shale* under the *Mahoning sandstone*, at Morgantown, W. Va. (L, 36). — Abundant in the *Green crinoidal limestone* of the *Pittsburgh barren measures* (K, 80; K3, 309). — *XIII*, *XIV*.

Zeacrinus merope, Hall. 17th Rts. Rt. N. Y., 1863. — Pal. Ohio, Vol. 2, 1875, page 178, plate 12, fig. 18, *natural size*, original specimen, showing structure of body and arms; differs from *Z. paternus* in its turbinate form of calyx, angulated and sculptured surface, and subangular arms; from *Z. scoparius* by its keel-shape body-plates, ornamented with rows of minute knobs. Richfield, O. *Waverly (Pocono) formation.* *X*.


X: 17.
Pal.Ohio.II.xii.

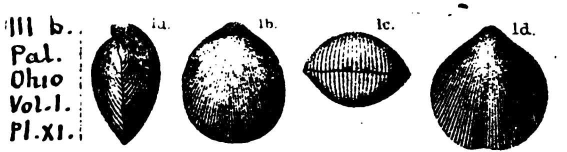
Zeacrinus paternus, Hall. Desc. Crin. Waverly Sandstone, 1869. Genus named by Troost because a field of them must have swayed to and fro at the sea bottom like a field of Indian corn (Zea) in the wind. — Pal. Ohio, Vol. 2, 1875, page 177, plate 12, fig. 17, type spec.; closely like *Z. scoparius* of the *Burlington limestone* in form, and forking of arms, but has a more spreading calyx, and longer arms, thicker armplates, not flattened on the back. Richfield, O. *Waverly shales.* *X*.

III b.
Pal. Ohio I, xi.
5a
5b.

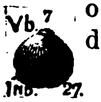
Zygospira cincinnaticesis. James. — Pal. Ohio, Vol. 1, 1873, page 126, plate 11, fig. 5*a*, *b*, *c*, dorsal, ventral, and front views. Under a strong lens, in good light, extremely minute, regular and crowded concentric striæ sometimes appear on the sides of the folds and other protected parts of the shell, like, but more distinct than, those on *Z. modesta*, of which it may be only a larger variety. Cincinnati, O., 250 feet above low water. *Hudson river strata. III b.*

Zygospira erratica.—Quoted by Stevenson (T2, 178) as seen in Bedford Co., at C. Miller's, on the road from Woodbury to Raver's gap, in the *Hudson river slate. III b.*

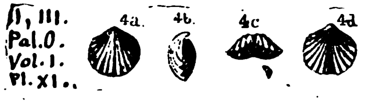
Zygospira headi. (*Athyris headi*, Billings. Pal. Foss. Vol. 1, 1862.)—Pal. Ohio, Vol. 1, 1873, page 127, plate 11, fig. 1*a*—*d*, profile, dorsal, front and ventral views. Billings found a specimen with its internal spires arranged like *Atrypa*. Hall showed that they had the paucispiral character &c. of *Zygospira*, which may prove to be only a subgenus or section of *Atrypa*. Canada, Ohio, Indiana. *Cincinnati* (*Hudson river*) *upper beds*.—Davidson refers (doubtfully) to it as an English shell from the *Caradoc limestone*—*III b.*



Zygospira minima, Hall. From Collett's Indiana Report of 1881, page 305, plate 27, fig. 7, *enlarged three times*, dorsal view.—*Niagara, V b.*



Zygospira modesta? (*Orthis testudinaria*). (*Atrypa, modesta*, Say.) Hall. Pal. N. Y. Vol. 1, 1847, *Trenton* and *Hudson river*.—Pal. Ohio, Vol. 1 1873, page 125, plate II, fig. 4*a*—*d*, ventral, profile, front and dorsal views of an adult indvidual. Very abundant and easily recognized at Turin in New York, only in the *Utica slate*, or *Trenton upper beds*; in Ohio, Indiana and Kentucky ranges from bottom to top of *Cincinnti group*, and up into the *Clinton*—In Pennsylvania. Center Co. at Bellefonte, Specs. 203–26 (OOO, 178), -14 (several); 210–26*a*,-138—In Huntingdon Co. at Tyrone forges, Spec 211 -8, -9.—In Mifflin Co. at Reedsville, Spec. 205–2, from beds probably lower than *Trenton II c.*


II, III.
Pal. O.
Vol. I.
Pl. XI.
4a.
4b.
4c
4d

Critical Emendations, Additions, Synonyms, etc., to Vol. 3.

533, 13. Read **subæqualis.**

547, 9. J. J Stevenson would erase *IX*, not believing in the existence of the *Catskill* formation in S. W. Pennsylvania.

642, 12. J. J. S. objects to the use of *XI* for the *Subcarboniferous limestones* of the West.

652, 3. For (*Kaskaskia*) read (*Chester.*) (G. K. Green.)

656, 28. Figure 54 of Vanuxem is *Sigillaria simplicitas.* Vanux. (C. S. Prosser.)

657. Figure 57 of Vanuxem is *Rhodea pinnata*, Daws. See Foss. Pl. Erian and U. S. of Canada, plate 3, p. 103. (C. S. Prosser.)

690, 7. Read Waldron, Ind.

718, 24. "Not *XV* in Pennsylvania." The same remark for p. 720, 1, 12. (J. J. S.)

759, 6. For "*Coal Measures*" read "Gaps"; and for *XIII* read *XI.* (J. J. S.)

761, 1. Shawneetown is in Illinois. (G. K. G.)

780, 8. "The specimen was found by myself in the Carroll quarry, one mile southwest of Le Bœuf station and is from the *Upper Chemung.* Quarry described in Q4, p. 239, line 9. (C. S. Prosser.)

780, 10. J. J. S. would read *Middle Chemung*, and others would do the same; but I think Ashburner and Carll are right in placing the Venango Oil series wholly or partly in *IX;* and, if so, the Third Oil Sand must belong either at the bottom of *IX* or at the top of *VIII.* (J. P. L.)

816, 26. J. J. Stevenson strongly doubts the fact stated by I. C. White that this species occurs at so great a height above the base of the Catskill.

818, 14. Erase *X?* (J. J. Stevenson.)

827, 2. G. K. Green says positively *Niagara.*

836, 11. Read Ptychoparia.

837, last line. Read *Upper Devonian* (*Hamilton.*) *VIII c.* (G.K. Green.)

839, 12. "This probably a *Palanatina;* certainly not *Ptychopteria.*" (Whitfield.) — 19. Read basal.

840, 26. Read lamellæ.

841, 1. Read **Ptychopteria.** — 8, 13. Read *Rhinodus.* — 9. Vol. 3, p. 71.

842, 13. The figures do not belong to Ptyonius. (E. D. Cope.)

843, 4. Read *Sauropleura.* — 19. Read basal.

844, 18. Read *winchellianus.* (J. F. James.)

846, 21. Read (*Sigillaria.*)

27. Since 1868 the fresh water *Zonites priscus*, Daw. has been found in the Nova Scotia coal measures; and other forms (*Bulima*, *Glandina*, etc.) in the Upper Cretaceous. (Claypole.)

848, 15. Read *Agnostus.* — 28 and 33. Read Ichnology.

23. Read American Geologist. Note.—Respecting these markings, J. F. James writes me, October 9, 1890: "Though at first inclined to think the marks illustrated by Perry were rain-drops I am not so sure of it now. There are other instances of similar markings known, however. One is figured on Pl. V, Vol. VII, of Jour. Cin. Soc. Nat. Hist., from the Cincinnati Group from Clinton county, Ohio. Evidence of beaches in the Cincinnati Group are accumulating. So there can no longer be a question but that some part of the strata were exposed to atmospheric action, or at least were covered by only a small depth of water."

852, 11 and 23. Read sponge. (J. F. J.) Read *Rhizopod* (G. F. M.)
854, 35. *R. oweni* is not found in Indiana. *R. sacculus* is. (J. C.)
3. If a *Receptaculites* the figure is upside down. (E. W. C.)
27. Read Sponge for Rhizopod. (E. W. C.) *R. oweni* is called the "Lead fossil" in the West. (E. W. C.)
856, 2. Read *caribou.* — 9. Read 1859.
After line 15. Insert **Rensselæria hamiltonia**, Claypole, from the *Hamilton rocks*, Perry Co., *VIII c.*
860, 15. E. W. Claypole wishes Simpson's note erased. — 18. Read 12,103.
19. Read 12,107, and erase the 12,876, 12,882. (E.W.C. who would change also Mr. Simpson's 59-10 to 59-9.)
861, 7. Read breathing apparatus. — 12 to 18. E. W. Claypole makes the correction, that all these specimens were got from *VIII* not *VII.*
862, 9. The same as *Archimedes wortheni*, Hall. (Whitfield.)
13. Read 1*a*, and for "coral" read "polyzoan." (G. F. M.)
863, 4. Read *Gor.* — 12. Read *Utica Slate, III a.* (Whitfield.) — 13. For *Retzia chlœ* read *Trematospira hirsuta*, Hall. (Whitfield.)
864, 13. Read *Trematospira multistriata*, Hall. (Whitfield.)
7. Read *punctulifera.*
865, 13. Read 1848. — 14. Read plate 85. — 31. Read "near bottom of *Coal measures*, above the *Conglomerate. XIII.* (E. W. C.) Read *Bockshianum.* — 38. Read plate 44. (Lacoe.)
866, 20. Read Vol. 1, 1853. (Lacoe.) Page 129 (J. F. J.)
867, 1. *Rhabdocarpus insignis*, Dawson, 1865. — 15. Read Mr. Lacoe.
868, 16. Read **Rhabdocarpon latimarginatum**, and *latimarginatus.*
17. Read 312.
870, 14. Read *Trichomanites* (E.W.C.) Read **Rhachophyllum.** (E.W.C.) But Shrimper's mode of spelling his genus has been generally adopted. — 32. Restore the *X* to its place before *III* so as to read *XIII.* — 23. Read Olyphant.
871, 1. Read (*Pachyphyllum fimbriatum*) and probably including *affinis* as a variety. (Lacoe.) — 4. For 8 read 1.
872, 25. Read 415. (Lacoe.)
873, 5. Read *gross-dentatus.* (Lacoe.)
23 to 26. "This is more than doubtful." (E. W. Claypole.)
875, 16. Read **frondosa.** — 15. Figure given on pages 1043, 1044.
877, 3. For "not distinguishable from" read "identified with." (J.W. D.)
31. Read, here and on page 879, **Rhombodictyon discus.** (E. W. C.)
879, 2. Read *Rhombodictyon.* (Whitfield.)
4. The appearance is merely a depression of the shell. (Whitfield.)
884, 1. This specimen (854-10) is probably a *R. contracta.* (H. S. W.) —
14. Read *Atrypa.* — 26. *R. brevirostris* is an *Anastrophia*, Hall; and *R. camura* is a *Trematospira*, Hall. (Whitfield.)

885, 22. Read *multicostatum.*

886, 34. This is the same as *Rhinchotreta cuneata*, Hall, on page 908. (Whitfield.)

887, 15. Read Vol. I, 1873.

28. The figure here given as Emmons' f. 23 is a *Strophomena;* the other figure of Emmons (f. 23 also) is a *Rhynchonella* (as is Hall's *Atrypa dubia*) and it should be substituted here. (Whitfield.)

888, 1. This figure is not of a *Rhynchonella.* (G. F. M.). *R. emma.* "No such species." (Whitfield.)

889, 15. There may be here a confusion of *R. formosa* with *R. contracta.* (H. S. W.)

890, 8. "Incorrect. The New York Trenton *R. increbescens*, Hall, to which Hall gave the name, is entirely distinct from Conrad's *R. capax* of the west." (Whitfield.)

14. Insert Pal. N. Y., Vol. 4, 1863.

891, 24. Read *Stenoschisma.* — 31. Read *multicostatum.*

892, 1. Read **R. macra.** Hall, 1858. *Warsaw group.*

12. Is this new species by Simpson not Hall's *R.* (*Leiorhyncus*) *multicosta?* (Whitfield.)

893, 11. *Zygospira modesta.* (Whitfield.)

12. Transpose dorsal and ventral. (G. F. M.)

894, 10. The first four figures in the second line (3 *a*, *b*, *c*, *d*) are probably not *R. modesta.* Erase XXVI as a wrong reference; and read for plate 15 (on the fourth line below) plate 8. (Whitfield.)

895, Last line. Read Sil. Foss.

897, 30. *Anomites* is Wahlenberg's genus, 1821. His species have been distributed under *Cyrtia*, *Atrypa*, *Productus*, *Orthis*, *Spirifera* and *Strophmena.* *Anomia* is a genus of Linnæus, 1767, (S. A. Miller's Cat.)

898, 28. Read *Leiorhynchus quadricostatum.* (Whitfield.)

898, 1. Read *ricinula.* — 8. Read *Zygospira recurvirostra.*

25. This *Atrypa rugosa* is not a *Rhynchonella.* (Whitfield; H. S. W.)

902, 3. Read A. G. — 7. *R. tennescensis* is the same as *R. stricklandi* on p. 901, (Whitfield.)

20. Read Marcou.

904, 21. For Winchell read Hall. See Trans. Alb. Inst. Vol. 4, p. 216, May, 1863. (J. C.) — 23. Insert *Niagara group.* (G. K. G.) — 27. Read *Camarophoria.* — 12. Read *Castanea.* — 905, 17. Read *Trematospiras.* — 18. Read Cemetary.

908, 18. Same as *Rhynchonella cuneata* on page 886 above. (Whitfield.)

10. Read *Nucleospira.* — 11. Read *Retzia.*

911, 15. These so-called roots are referred by Lesquereux to *Sphenophyllum tenerrimum*, Ett. Coal Flora, III, p. 728, pl. 92, figs. 9 to 10 *a*, where other and better specimens from the same locality are described and figured. (Lacoe.) — 24. For *Rotophycus* read *Asterophycus*, which see above in Vol. 1, pp. 44, 45. (Lacoe.)

912, 20. Read *Clathropteris rectiuscula.* (E. W. C.) On the cuts of 912,-913 read Ichnology.

i (381, 4, 5) Read *Dikellocephalic.* — 25. (378) Read subcortical. — 26 (378). Read spikes. (Lacoe.) — ii, 23. Read neuropteroid.

iii (479, 2). Read *Linnarssonia.* — (486). Read *Phlegethontia.* — 22. Read confirm. — 14. Read (Matthew.)

iv. (531, 1.) Read *punctostriatus.* (E. W. C.) — (563, 17.) Read *Orthonota.* — 14. Read Strophodonta.

v. 8. Read carnivorous.

vi. 6. For 9 read 4. — 7. Read plate 34.

vii (661, 28) "*Guilelmites* is correct." (E. W. C.) — line 29, read 1858.

viii. (723) Read Maquoketa. (J. F. J.)

ix. Read *Cyathaspis*, *Diplastis* and *Scaphaspis.* (G. F. M.)

x. (823) Read "J. A. Stevenson," not J. J. Stevenson. (E.W.C.) — (833) Read *ouangondianus.*

914. *Rusophycus bilobatus.* Most probably casts of crustacean burrows. rows. (J. W. D.)

915, 1. *Saccocrinus* is called *Periecocrinus* by Wacks. and Springer. (Whitf.) — 26. Read *speciosus.*

917, 16. Read *caudata.* (Lacoe.) — 1. *speciosus.*

918, 7. Read **rhiofolia**, and Fontaine's. — 22. This is a fucoid, if vegetable. (E. W. C.)

919, 38, 39. Read a group of Pteropods. (E. W. C.)

922, 4. Read *Sphenotus aëolus.* (Whitfield.)

923, 5. Read *Goniophora chemungensis.* — 18. Read *Sphenotus obliquus.* (Whitfield.) — 28. **S. plicatus.** (E. W. C.)

924, 1. Read *Sphenotus rigidus.* — 6. Read *Modiomorpha sanduskiensis.* — 22. Read *Goniophora truncata.* — 37. Read *Spathella ventricosa.* (Whitfield.)

925, Last line. "Never found at Fort Cassin." (Whitfield.) — 28. Boh.

931, 24. *Decadocrinus ægina*, Wack. and Sprenger. (Whitfield.) — 19. For **Onchus** read **Palæaspis.** For opposition read unison. (E. W. C.)

932, 11. *Graphiocrinus carbonarius*, Wack. and Sprenger.

15. *S. hemi.* is *Eupachycrinus craigii*, W. and Sp.

19. *Decadocrinus liriope*, W. and Sp. (Whitfield.)

933, 9. *Decadocrinus subtortuosus*, W. and Sp. — 16. G. K. Green prefers *varsouviensis;* and the same on page 971, line 26.

934, 7. Read *Prototypus.* (E. W. C.)

935, 16. *Schizocrinus.* "Hall puts this *Scaphiocrinus* everywhere, and refers it to *Keokuk limestone.*" (Whitfield.) The error is mine. (J. P. L.) — 20. Insert "Hall" after *nodosus.* — 25. **Cytherodon.**

938, 12, 27. Claypole prefers *medinensis.*

940, 6. Read *Schizodus.*

943, 7. Read **Rhacophyllum.** (Lacoe.)

945, 29. "The species of **Scutinoblattina** from the Fairplay *Trias* should have a place here just as much as **Spiloblattina** given upon page 993. Proc. Acad. Nat. Sci. Philada. 1885, 110 &c." (S. H. Scudder.)

945, 29. For **Seleginites** read **Eurypterus.** Dawson has withdrawn this from the plants and recognized it as a portion of the scaly covering of a crustacean. — 18. Read Franklin Co.

947, 25. Claypole prefers *cestrensis.*

948. On cut read Ichnology, Mass.

949, 15. Read Selachians.

950, 9. For 1874, *XIII*, read 1853. Ann. Sci. Cleveland, Vol. 1, p. 164, fig. 3, from shale over coal at Cuyahoga Falls, O. *XII.* (Lacoe.)

951, 18. Erase W. — 31. Insert "*Syringodendron brongniarti*, Gein." between St.) and Lesqx. (Lacoe.)

952, 20. Read 161.

953, 11. Read *c*, inner bark. — 34. *S. elegans* is due to Brongniart. Lesquereux marks both it and *S. knorrii*, Brt. synonyms of *S. tessellata*. (Lacoe.) — 13. *L. chemungense*.

954, 2. Read *S. lescurii*.

955, 4. Read 499. — 10. Read Plymouth. — 16. Read **leveretti**. (Lacoe.)

956, 12. That is in Montgomery Co., Va. — 16. *S. latior* is an inedited variety. — 25. Erase "colliery." (Lacoe.)

959, 15. Insert "Since discovered by Prof. R. Zeiller in the coal measures of the north of France. (Lacoe.) — 21. *S. obliqua*, Brongniart.

960, 1. Read *S. rhomboides*. — 7. Duquoin. — 8, Olyphant. — 27. Vascular scars. — 29. Mr. Lacoe. — 32. Fig. 4. — 36. Millimeter, centimeter. — 39. *Brongniarti*. (Lacoe.)

961, 33. Read *hippocrepis*.

962, 1. Read *yardleyi*. — 2. Fig. 2. — 5. 1853, Ann. Sci. Cleveland, XII. — 8. 459. — 32. *S. rugosa*, near *S. pittstoniana*. See Brt. Hist. Veg. Foss., p. 476, pl. 144, fig. 2. Wilkesbarre. *XIII*. (Lacoe).

963, 1. Read 1858. — 28. Read Goldenberg. (Lacoe.)

964, 1. Fig. 51 of Vanuxem was called by him a *Lepidodendron*. The figure of *Sigillaria simplicitas* is given on page 656 of this Dictionary. Lesquereux was in error in saying that the specimen was found near Buffalo in the *Hamilton*. It was found in Chenango county, N. Y., in the *Oneonta* group (?) (C. S. Prosser, Sept. 27, 1890.)

965, 7. Read *Sydnensis*. — 10. Not one-half, but one-twelfth. (Lacoe.)

966, 27. Substitute for this line the following: **S. yardleyi**, Lesqx. Coal Flora, p. 491, pl. 73, fig. 2. Raush Gap and Pottsville. *XIII*. (Lacoe.)

967, 9. Read *Connoquenessing*. — 35. Read *Sigillaria*. (Lacoe.)

968, 14. Read Dr. Shufeldt. — 22. *Macrocheilus*; and the same on page 969, 2, 9, 12, 26. — 30. Read *humile*. (E. W. C.)

970, 6, 7. Claypole prefers *paludiformis*. — 18. *S. texanum*, and *M. texanum*. (E. W. C.) — 21. Read figs. 15 *a*, 15 *b*. (G. K. G.)

971, 1. Read *Naidites anodontoides*, Dawson. (Whitfield.)

25. Add *Coal measures. XIII*.

972, 17. Read **holomatopa**, Angelin. — 22. *Cambrian*. — 29. *P. orestes*, Hartt species.

973, 1. Hartt's species. — 4. Read Mr. Lacoe's.

974, 12. "This seems a wide range for a genus of trilobites, which in Europe (so far as I know) is strictly Ordovician. (G. F. M.)

16. "I believe this figure is more of a burrow of an annelid than a plant." (J. F. J.)

33, Read **cooperense** and *Macrocheilus*. (E. W. C.)

975, 30. Emmons should have written it *bubastiforme*. (E. W. C.)

965, 7, 8. The *Acer sacharinum* is itself the rock maple tree. (E. W. C.)

25. Lesquereux in his autobiography states this distinction. (J.P.L.)

977, 19. "No genus of moss so old as the Coal measures is known. If the coal of that period resulted from the decay of sphagnum it is strange that no trace of the plant has been found in Carboniferous rocks." (G. F. M.) Same criticism by J. J. S.

978, 5. Read 309. — 6. *Saxifragæfolium*. — 7. Kentucky. — 10. Brongniart. — 20. Duquoin. — 29. Here insert the synonyms and remarks given on page 982, lines 3 to 9. (Lacoe.)

979, 5. Read "like those of *Tmesipteris.*" — 7. Cryptogamous. — 10. Read (Germar.) — 27. For Gis read Isis. — 28. Verst. (Lacoe.) — 9. Claypole prefers *oblongifolius.*
980, 18. Read Vol. 17, p. 167, plate 4, figs. 1 to 5 *a*, 1877.
20. For 17 read 47. (Lacoe.)
981, 18. Read by Mr. Lacoe. — 26. **tenerrimum.** (E. W. C.)
982, 1. *S. trifoliatum* is a syn. of **S. erosum** (p. 978 above) to which subsequent lines 3 to 9 should be transferred. (Lacoe.)
6. Read *quadrifidum.*
982, 1. *S. trifoliatum* is a syn. of **S. erosum** (p. 978 above) to which subsequent lines 3 to 9 should be transferred. (Lacoe).
6. Read *quadrifidum.*
982, 10. "This does not seem to me the figure of a *Sphenophyllum.* The leaves (or clusters of leaves) appear to be alternate and arch outward. In *Sphenophyllum* they stand out abruptly. Perhaps it is a filicoid plant; or more likely a gymnosperm." (G. F. M.)
983. Figure upside down. — 25. Read 2, 2 *b*. — 26. 1884.
984, 17. Read *crithmifolia.* — 18. *fascicularis.* — 19. fig. 9. — 23. Olyphant. — 28, p. 291. (Lacoe.) — 27. **S. flaccida.**
985, 20. *S. glandulosa* is a syn. for **Pecopteris glandulosa,** Lesq. (See p. 799 above) and therefore erase all from "Geol. Pa.," to "leaflets." (Lacoe.)
986, 8. This synonomy is only probable. See Coal Flora, p. 208. (Lacoe.)
4 and 12. Erase *Upper*, and consequently *IX*. (G. F. M.)
987, 2. Read Alabama. — 11. *Athyrioides.* (Lacoe.)
988, 5. *S. pendulata* is inedited.
11. Read *Sphenopteroid.* — For *C. decipiens* read *Pseudopecopteris* (*Sphenopteris*) *decipiens.* Lesqx. (Lacoe.)
14. Erase *Upper*, and *IX*. (G. F. M.)
989, 20. *S. squamosa.* See *Pseudopecopteris anceps.* (Lacoe.)
990, 2. Also in coal 1 (*Sharon coal*) at Akron, O. (E. W. C.) — 6. Prel.
993, 17. Read *gardineri.* (S. H. S.)
36, 37. For these substitute **Palœoxyris corrugata,** Lesqx. Geol. Sur. Ill. IV. 466, 1870; a syn. of *Spirangium prendelli*, Lesqx. (Transfer this to p. 590 above.) (Lacoe.)
994, 10. *Spiraxis* is preoccupied, and Prof. H. S. Williams in 1887 proposed *Prospiraxis.* See Bull. U. S. G. S. No. 41, p. 86, note. (C. S. Prosser.) — 12. Read Ettingshausen.
995, 18. Read *Hyalonema*, the anchoring cable of a sponge. (G. F. M.)
31. The figures 123, *5*, *a*, *b*, are *Spirifera mesacostalis*, Hall. See Pal. N. Y. Vol, 4, page 240. (C. S. Prosser).
997, 3. Read *S. cuspidata.* — 6. *chemungense.* — 7. *muricatus.* (E. W. C.) — 15. Add Vol. VII.
999, 25. Read *mucronatus.*
1000, 18. For Geol. read Iowa. Erase Hall from the cut, and substitute Meek. — 29. For *S. brachynota* read *Orthis biforata* var. *lynx*, Eichwald. (Whitfield.)
1001, 4. Read dorsal view, &c. — 20. Read *d* (fig. on next page), cast of interior of ventral valve. (G. F. M.)
1003, 13. Read *crenistriatum.* — 14. Read Hisinger. — 18. Add: fig. 19, interior of ventral valve. (G. F. M.)
1004, 15. "Not found in New York." (Whitfield.)

1005, 10. For *decemplicata* read *sulcata*, Hisinger, the figs. for which are 36, 4, 4 a. See Pal. N. Y. Vol. 2. The four little figures 88, 8, represent *Orthis biloba*, L. (Whitfield.)

1010, 4. Read *Cussewago.* — 20. *Schoharie.*

1011, 29. Read *multicostatum.*

1012, 2. Read 11,680. — 3. Erase 12,189 (poor.) — 4. Erase 12,410 to *Fenestella.* (E. W. C.)

1014, 2. Read 12,306. — 7. Erase 12,257. — 10. Erase 12,831. (E. W. C.) — 23. For Hall, read Clapp. (G. K. G.) — 30. *S. hamiltonensis* is a species unknown to me. (R. P. W.)

1015, 4. Found also in Perry Co., Pa., Watts township. (E. W. C.) — 7 and 9. Read *Kaskaskia limestone.* (G. K. G.) — 12. Read *S. pennata.* Same error made on p. 1026.

1016, 1. Roger's figure 643 is not of this species, but of *Spiriferina perlamellosa.* (Whitfield.) — 19. Erase 12,803, 12,806. (E. W. C.)

1019, 25. Erase 11,879; also 11,925 (poor); also from 11,932 to impressions); also 12,032. (E. W. C.)

1021, 3. The four 12,194 are *S. mesocostata;* the three 12,303 are *Rhync. contracta.* — 15. Erase 11,876, 11,029, 11,219, 11,898. (E. W. C.) — 15. Read *ligea.* — 20. Erase 12,180 to species. (E. W. C.)

1022, Near bottom of page, Hall's three figures 85, 3, 3*a*, 3*b*, do not belong to this species, but to *Spirifera macronota*, Hall. (Whitfield; H. S. W.)

1023, 26. Erase 12,106. — 29. The ten labelled 11,682 are all *Strophodonta.* — 34. 12,102 should be 59–3 in OOO. — 35. Erase 12,180, probably. (E. W. C.)

1024, 24. Read Sowerby.

1025, 4. Read by preference Marcou's original name of *S. rockymontana.* (Whitfield.) See line 15.

1026, 1. Read *Spiriferina perlamellosa;* (Whitfield.)

1027, 7. *S. hirtus*, W. and W. has precedence of *S. præmatura.* (Whit.)
23. For *prolata* read *disjuncta*, Sow. (Whitfield.)

1029, 1. Read *Spiriferina raricosta.* (Whitfield.) — 10. There are at least a score of *Spirifers* in the *Corniferous.* (E. W. C.)

1031, 28. There is no *Spirifer* of *Trenton* age. This figure of Emmons is only an *Orthis lynx.* (Whitfield; H. S. W.)

1032, 2. *S. undulata* is a synonym of *S. raricosta*, Conrad. See page 1029. (Whitfield.) — 27. Read *verneuli.* (G. F. M.)

1033, 6. Read epitheca. — 26. This figure of Rogers (694) represents a *S. cameratus*, Morton. (Whitfield.) *Spirifera camerata.* (H. S. W.)

1035, 6. Specimens of this, or of a closely allied species, are abundant in *Waverly* strata at Freestone, Rowan Co., Ky., and also in *Devonian* strata near Junction City, Boyle Co., Ky. (J. F. J.)

1036, 4. Read 128. — 35 to 39. Erase all. There is no species of that name. Hisinger's species is *A. circinatus* from Sweden. (Lacoe.) No such species in the rocks of Southern Ohio. The genus does not occur below the *Devonian.* (J. F. J.)

1037. Markings similar to this figure of Vanuxem, made by the tentacles of marine animals, are found in the *Cambrian* rocks, at St. John N. B. (G. F. M.)

1039, 10. For this line read "*S. typum*, Hall, 16th An. Rt. S. C. N. H. p. 80, pl. 2, figs. 1 to 3, 1863. See figs and description on page 1161 below under **Taonurus typus.** (Lacoe.)

1041, 5. Compare *Branchiospongia digitata*, Owen, of C. E. Beecher's memoir, New Haven, 1889. But all the digitate sponges had a central body. (G. F. M.)

1042, 9. *Hyalostela.* (G. F. M.)

1043, 7. Read pyritized. — 34. **Rhombodictyon.**

1045, 21. For the original descriptions of *Sporangites* and *Protosalvinia* see Dawson, Canadian Record of Science, Vol. 1, 1884; and Bulletin, Chicago Acad. 1886. The figures here given are not characteristic. (J. W. D.) — 22. Read **bilobatus.** (E. W. C.) — 24. Read macrospores.

1046, 13. For "probably the pollen of plants" read "certainly the Sporocarps of Rhizocarps." (J. W. D.) Certainly not pollen. (E. W. C.) — 1. Read *except 12 and 13.* (G. P. M.) — 33. Read **papillatus.** (E. W. C.)

1047, 1. Insert "probably" belonging. (Lacoe.) — 4. Read Joggins. — 6. Claypole would read **S. plana.** — 7. For seeds, Sporocarps. — 11. Read *Selaginelleæ.* (E. W. C.) — 28. For *polystomella* read *antheloidea.* The genus should be **Constellaria** (Dana, 1846, *Stellipora*, Hall, 1847.) *C. constellaria* is parasitic, C. polystomella is ramose, and occurs in Ohio and Kentucky in abundance at certain horizons, and beautifully preserved. See remarks in Jour. Cin. Soc. Nat. Hist. Vol. II, April, 1888, p. 31. (J. F. J.)

1048, 7. Insert; abundant at Cincinnati, with four other species in *Hudson river group. II c.* (E. W. C.)

1049, 22. Read fig. 5. (Lacoe.)

1050, 13. For S. read **Caulopteris**, and transfer to p. 121 above. (Lacoe.)

1051, 2. Read page 838. — 25. Read Vol. I, 1873.

1052, 8. Read *Asteroidea.* — 9. Read Richmond, Indiana.

1053. Stenopora. Professor Nicholson states as the result of his investigations that *Stenopora* of Lonsdale is very different from *Stenopora* of McCoy. The species referred to the genus by the latter seem to all belong to Monticulipora. He separates *Stenoptera* McCoy upon the peculiar mode of growth of the corallites, these being constructed at intervals in planes parallel to the surface by ring-shaped thickenings of the wall. (See *Tabulate Corals* by Nicholson, pp. 168-170; also figures on p. 173.) This being the case the three species given in the Dictionary (pp. 1052-1053) are not true *Stenopora* but *Monticulipora* or an allied genus. The form given as *S. petropolitana* it is impossible in the present state of our knowledge to place properly, for the many forms with this shape have received different names. The figures given to illustrate *Sten.* (*M.*) *fibrosa* certainly represent two and perhaps three species. (J. F. J.)

1055, 18. Erase 12,340.

19. For "his own" read "Claypole's." (E. W. C.)

1056, 14. Erase 12,187. (E. W. C.)

1061, 23. For *Huronian* read *Cambrian.* (E. W. C.) — **Stenotheca is a genus** established by Salter and used by Hicks. The type is a minute peltate crustacean with folded carapace. Hence *Discina acadica* of Hicks is not a *Stenotheca* being a univalve gasteropod allied by its muscular scar to *Pannophorus*. See Geol. Mag. Sept. 1885. (G. E. M.) — 10. "Not very near Bedford." (J. J. S.)

1062, 25. Read **Dadoxylon**, etc. (E. W. C.)

1064, 14. Read (*Ptilodictya*).

1065, 16. Read Ulrich.

1067, 19. Read **Striatopora linnæana**. (Whitf.) — 7. Read *Ptilodictya*.

1069, 2. Read Ptilodictya.

1073, 4. Read *Phytolithus*. (E. W. C.) — 3. *Fucoidites*. (E. W. C.)

1074, 6. For "floating stem" read "main root." (J. W. D.)

14. Apropos of *roof* shales, Dawson remarks that "In such a case the roof shale had become a new soil, which is not an unusual circumstance. — 10. For Collett, read Lesquereux.

1075, 2. Read *S. irregularis* Lesqx. a syn. of **S. sigillarioides**, Goepp. (Lacoe.)

1077, 36, 37. Read Mazon.

1078, 23. Read **S. crenulatus**. — 11. *asperostriata*.

1083, 28. Read *richmondense*. — *Strephochetus* is probably a synonym for the earlier **Girvanella**, Nich. and Ether. Jr. 1878. (J. F. J.)

1084, 7. Read *boreale*. (E. W. C.)

1085, 5. "This western species is entirely distinct from the *S. corniculum* of Hall in the *Trenton* of N. Y. and is the *S. canadense* of Billings. The error of identity is perpetuated from Edwards and Haime, Poly. Foss. de Terr. Pal. (Whitfield.)

80. Emmons' fig. 6, of 1855, is of a *Macluria sordida* (*Straparollus sordidus*, Emmons,) and should be referred to under that head." (Whitfield.)

1087, 14. Read *proliferum*. — 23. 12,494. (E. W. C.)

1089, 6. *S. americanum* is not *Streptorhynchus* in any sense or way. (Whitfield.) — 15. Read *bilobatum*. (E. W. C.)

1091, 31, 33. *S. arctostriata* has none of the features of Pander's genus *Hemipronites*. (Whitfield.)

1093, 11. Read Pictou. — 1. Read **Hemipronites**. — 28. Ventral.

1094, 11. Read *S. minus*. (E. W. C.) — Read pseudo-deltidium.

1096, 17. Vol. I, 1873.

1099, 10. *S. woolworthana* a synonym of *S. radiatum*, Vanuxem. (Whitfield.) — Read, line 8, **S. vetustum**.

1101, 12. This figure 7 is not *S. linnæana*, Bill. but *S. alba*, Davis, *Upper Helderberg*. See Kentucky Report of 1880. (G. K. Green.)

19. Read **Amphigenia elongata**, Hall. (Eaton's species.) Interiorly it differs entirely from *Stricklandinia*, and belongs to a different family of Brachiopods. (Whitfield.)

1102, 14. Read **Stomatopora**, a Bryozoon. (Whitfield.)

9. *Maclurea*. Also, read *Streptochetus*. (G. F. M.)

1104, 36. Read **Stomatopora**. (Whitfield.) — 9. Orbisonia.

1105, 2, 5, 24. All three are species of **Stomatopora**. (Whitfield.)

5. *S. densa*. (E. W. C.) — 1. *Aulopora*. — 23. (*Alecto*.) — 24. *frondosa*.

1106, 4. Read **Stomatopora**. (Whitfield.)

1107, 10. But have the sponge-spicules been seen? (G. F. M.)

1108, 4. Read **Stromatopora**.

1109, 16. *Strophodonta ampla* is now **Strophonella**, Hall. (Whitfield.)

1111, 8. Read *Strophonella cavumbona.* (Whitfield.)
14. Vanuxem's fig. 45 and Hall's fig. 120, 5, 5 a, are called by Hall (Pal. N. Y., Vol. 4, p. 112) *S. mucronata.* (H. S. W.) The two lower figures are *S. cayuta*, Hall; the others above, are *S. nervosa*, Hall. (Whitfield.)
1116, 1. Read **Chonetes mucronata.** (H. S. W. and R. P. W.)
1117, 15. The last figures (7, 8,) are *S. perplana.* (R. P. W.)
24. Erase (called *S. parvula.*) See RR., p. 16. (E. W. C.)
1118, 10. Read **Strophonella.** (R. P. W.)
1120, 3. Read **Streptorhynchus**, the same as *S. radiatum*, Vanuxem. (R. P. W.) Read *Woolworthianum.* (E. W. C.) — 18. Erase "in *Trenton limestone*," in which are no *Strophodontas.* (R. P. W.)
1121, 1. Read **acutiradeatum.** (E. W. C.)
1124, 1. *S. alternistriata* is only the inside of *S. alternata.* (R. P. W.)
14. Read *pectinaceum.* (E. W. C.)
15. Synonym of *Streptorhynchus chemungensis.* (H. S. W.; R. P. W.)
1125, 14. Read **cornutus.** (E. W. C.)
15. *S. corrugata* is a synonym of Hall's *Strophodonta striata.*
19. Insert after *crenistria*, Hall. (R. P. W.)
1126, 3. *S. depressa* is a synonym of *S. rhomboidalis.* (R. P. W.)
19. *S. elegantula* is the same as *L. transversalis.* (R. P. W.)
29. Read **filitextum.**
1128, 27. Vanuxem's figure 45, 2 is an *Orthis.* (R. P. W.) — 10. *Page* 1113.
1129, 9. Read Chonetes lineatus.
10. Read **P. membranacea.** See Pal. N. Y. Vol. 4. (R. P. W.)
13. *S. mucronata* is a **Chonetes.** See Pal. N. Y. Vol. 4. (R. P. W.)
1130, 1. The Canadian figure 208 is a *Leptæna.* (R. P. W.)
7. Rogers' fig. 631 is not *S. patenta.* (R. P. W.)
29. "(now **Anomia**)" is a bad error. See Geol. Canada, 1863. It is really *Streptorhynchus subplanum. Con.* (R. P. W.)
1131, 13. It is now **Strophonella punctulifera.** (R. P. W.)
1132, 1. Read *Chonetes lineatus.* — 9. Read 1881. — 33. Read Wahl. 1821.
1133, 21. Read **C. setigerus.** — 22. *S. sinuatum.* (E. W. C.)
1134, 1. See *Strophodonta striata.* (R. P. W.) — 14. Read page 164.
6, 8. Read *subplanum* and *sulcatum.*
1135, 3. Read *Strophomena.*
1137, 21. Figs. 1 and 2 are of *Strophostylus transversus*, Hall, Pal. N. Y. Vol. 3, plate 114. Fig. 3 is *S. andrewsi*, Hall, Pal. N. Y. Vol. 3, plate 118. (R. P. W.)
1139, 7. The circular marks on the figure show where a *Platyceras* shell was attached to and lived on the surface of the Crinoid. (J. Collett.) — 8. Read M. primigenium.
1140, There is no sufficient evidence to prove this a *Stylonurus.* (E. W. C.)
1043, 23. Read **Richardsoni.**
1145, 12. Add "Similar markings abound on the *Niagara* of Fayette Co., O. (E. W. C.) — 10. For species, read spaces.
1147, 5. Read Trevorton.
1148, 21. Read *verticillata.*
1149, 4. The fig. 63, 3 is that of *Eridophyllum simcoensis*, Billings. *Upper Helderberg limestone, VIII a.* (R. P. W.) It is *Diphyphyllum arundinaceum*, Bill. (G. K. Green.)

1150, 5. For mosses, read zoophytes. (G. F. M.)

1151, R. P. Whitfield questions if Simpson's fig. 2 be not *Spirifera carteri*, Hall.

1152, 33. Read *Batrachoides.* Same error, 1154, 2.

1154, 13. Read page 331; and page 464 (Lacoe.) — 18. *Lycopodiaceæ.*

1155, 17, 18. Erase all after Alabama, and read *XII.* (Lacoe.) — 13. 1883.

7. "A similar but larger species occurs in the roof of the *Sharon coal* near Akron, O. (E. W. C.)

1157, 14. Read *Ætiobatis.*

1162, 9. *Forbesocrinus.* Some species of this genus have lately been found with a disc like that of a Neocrinoid, thus effacing the distinction between the Palæo and Neo-crinoids. (E. W. C.)

1064, 1. Read *Macoma.* (E. W. C.) *T. calcarea* and *T. proxima* are one and the same species. (J. W. Dawson.)

11. Read *Forbesocrinus.* (S. A. M.)

1168, 26. *T. lineata* is certainly not a *Tellinomya.* (R. P. W.)

1171, 1. Read **latum**. (E. W. C.)

1175, 17. Read *Shaly.*

1176, 22. After Clark's mill add: where there are millions of them. (E. W. C.)

1177, 23. Waldron, Ind.

1178, 14. Read *T. spicula.* (E. W. C.)

1179, 20, 21. "The four species mentioned here are probably all the same. The differences are too slight to base species upon. A form occurs in the *Cincinnati group* of Iowa, west of Dubuque, not separable from the Cincinnati forms." (J. F. J.)

1182, 31. Read *prisca.*

1183, 12. Read silicious. — 26. *verneuliana.* (E. W. C.)

1185, 1. Read **Thamniscus**. — 7. genus. — 1186, 10. Read *parvidens.*

1188, 4. Read Terrell. — 9. (coracoid.) — 15. Read **Titanichthys**.

18. For "dragon fly" read "walking-stick" [mantis.] (S. H. S.)

20. Read 756. — 26. Same correction. — 26. Read **juconda**, (E. W. C.)

1189, 17. Read **inæquale**. (E. W. C.)

1195, 13. This conclusion may apply to some so-called *Rusichnites*, but certainly not to all. Billings, Northurst and Dawson have already referred some transversely wrinkled tracks to Gastropods. (J. W. Dawson.) But see on this statement Nicholson's Palæontology, Vol. 1, page 526. (E. W. C.)

1196, 28. Read *crassum; holyokense; bellum;* 35, *crassus;* 36, *inæquale;* 37, *introvergens.* (E. W. C.)

1197, 1. Read *deweyanum, gracile, gracilius, obesum.* — 5. *Macropterna.*

7. *falcatum, breviusculum.* (E. W. C.)

1201, 15, 28, and on page 1202, 10, 15. Read Waldron, Ind.

1203, 23. Read **Rhynchospira**. — It must go back into **Retzia**. (R. P. W.)

1204, 10. T. globosa is a true **Retzia**. (R. P. W.)

1205, 1 to 8. "This is based on a *Hamilton* specimen and should be stricken out from Pal. nomenclature." (R. P. W.)

1206, 13. *Chester sandstone.* (G. K. G.) — 1207, 1. Read Triænopus.

1213. On cut, Ichn. — 16. *T. avellanum.* — 3. Insert Lesqx. Ms.

1214, 37. Read Sir John W. Dawson.

1215, 8, 9. Transpose E and F. (Lacoe.)

1216, 18. Erase *Upper* and *IX.* (G. F. M.)